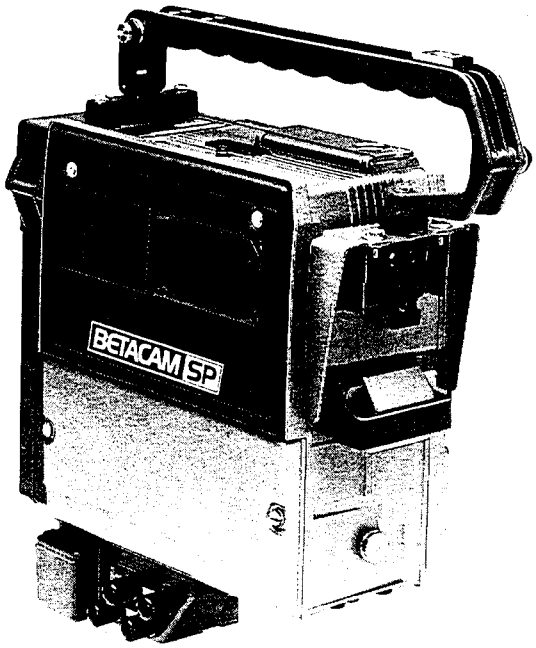
SONY

VIDEOCASSETTE RECORDER

# BVV-5PS




BETACAM SP™

MAINTENANCE MANUAL

Volume 1 3rd Edition (Revised 1)

Serial No. 13633 and Higher

EBU N-10 LEVEL

このマニュアルに記載されている事柄の著作権は当社にあり，説明内容は機器購入者の使用を目的としています。
従って，当社の許可なしに無断で複写したり，説明内容(操作，保守等）と異なる目的で本マニュアルを使用することを禁止します。

The material contained in this manual consists of information that is the property of Sony Corporation and is intended solely for use by the purchasers of the equipment described in this manual.
Sony Corporation expressly prohibits the duplication of any portion of this manual or the use thereof for any purpose other than the operation or maintenance of the equipment described in this manual without the express written permission of Sony Corporation.

Le matériel contenu dans ce manuel consiste en informations qui sont la propriété de Sony Corporation et sont destinées exclusivement à l'usage des acquéreurs de l'équipement décrit dans ce manuel.
Sony Corporation interdit formellement la copie de quelque partie que ce soit de ce manuel ou son emploi pour tout autre but que des opérations ou entretiens de l'équipement à moins d'une permission écrite de Sony Corporation.

Das in dieser Anleitung enthaltene Material besteht aus Informationen, die Eigentum der Sony Corporation sind, und ausschließlich zum Gebrauch durch den Käufer der in dieser Anleitung beschriebenen Ausrüstung bestimmt sind.
Die Sony Corporation untersagt ausdrücklich die Vervielfältigung jeglicher Teile dieser Anleitung oder den Gebrauch derselben für irgendeinen anderen Zweck als die Bedienung oder Wartung der in dieser Anleitung beschriebenen Ausrüstung ohne ausdrückliche schriftliche Erlaubnis der Sony Corporation.

# TABLE OF CONTENTS

Volume 1

## 1. TECHNICAL INFORMATION


1-1. Specifications . . . . . 1-1
1-2. Setting of the System Select Circuit . . . . . 1-3
1-3. Input/Output Signals of the Connectors . . . . 1-5
1-3-1. 50P Connector . . . . . 1-5
1-3-2. 20P Connector for PB Adaptor, VA-500P . . . . . 1-8
1-3-3. 4P Connector for Component/Composite Adaptor, VA-5P . . . . . 1-9
1-4. Connection Connector . . . . . 1-10
1-5. Supplied Accessories . . . . . 1-11
1-6. Optional Accessories . . . . . 1-12
1-7. Use Under Special Environment (Measure for Cold Area) . . . . . 1-12
1-8. Removal and Installation of the VTR and Camera . . . . . 1-13
1-9. Removal of Lids and the Panel . . . . . 1-14
1-10. Main Parts Location . . . . . 1-15
1-10-1. Location of the Printed Circuit Boards . . . . . 1-15
1-10-2. Location of the Main Mechanical Parts/ Components . . . . . 1-17
1-10-3. Location of Micro Switches and Sensors . . . . . 1-19
1-11. Printed Circuit Board . . . . . 1-20


## 2. PERIODIC CHECK AND MAINTENANCE


2-1. Maintenance Time Table . . . . . 2-1
2-2. Maintenance . . . . . 2-2
2-2-1. Hours Meter . . . . . 2-2
2-3. Maintenance after the Repairs . . . . . 2-3
2-4. Cleaning Procedure . . . . . 2-3
2-4-1. Video Head . . . . . 2-3
2-4-2. Audio/TC, Audio Confidence Heads . . . . 2-3
2-4-3. CTL, FE (Full Erase) Heads . . . . . 2-4
2-4-4. Tape Movement Areas . . . . . 2-4
2-5. After Exposure to Sand or Dust . . . . . 2-5


## 3. SERVICE INFORMATION


3-1. Removal and Installation of the VTR and Camera . . . . . 3-1
3-2. Removal of Lids and the Panel . . . . . 3-2
3-3. How to Open the Printed Circuit Boards . . . . 3-2
3-4. How to Remove the Cassette-up Compartment . . . . . 3-4
3-5. How to Put the VTR into the REC Mode without Connecting a Camera . . . . . 3-4
3-6. How to Put the VTR into Threading Completion Mode without Cassette Tape . . . 3-4
3-7. Spare Parts . . . . . 3-5
3-8. Caution for Electrical Part Replacement . . . . 3-6
3-8-1. Micro Switch . . . . . 3-6
3-8-2. Chip Parts Replacement Procedure . . . . . 3-6
3-9. Flexible Printed Circuit Board . . . . . 3-7
3-10. 50P Connector . . . . . 3-8
3-11. When a Tape Slack is Activated, How to Remove the Cassette Tape . . . . . 3-9
3-12. When Power is not Available, How to Make the Cassette-up Compartment Up State . . . . . 3-9
3-13. Manual Gear . . . . . 3-10
3-14. Self-Diagnostics . . . . . 3-11
3-15. Alignment Fixture . . . . . 3-12


## 4. REPLACEMENT OF THE MAJOR PARTS AND COMPONENT


4-1. Replacement of the Supply Side Reel Table . . 4-1
4-2. Replacement of the Take-up Side Reel Table . 4-2
4-3. Replacement of the Supply-side Reel Table Rotation Detector (PTC-11 Board) . . . . . 4-3
4-4. Replacement of the Take-up Side Reel Table Rotation Detector (PTC-11 Board) . . . . . 4-3
4-5. Replacement of the Loading Motor . . . . . 4-4
4-6. Replacement of the Drum Motor . . . . . 4-5
4-7. Replacement of the Capstan Motor . . . . . 4-6
4-8. Replacement of the Reel Motor . . . . . 4-7
4-9. Replacement of the Upper Drum . . . . . 4-8
4-10. Replacement of the Drum Ass'y . . . . . 4-10

4-11. Replacement of the Audio Head . . . . . 4-11
4-12. Replacement of the CTL/FE (Full Erase) Head . . . . . 4-11
4-13. Replacement of the Gear Ass'y . . . . . 4-12
4-14. Replacement of the Entrance Guide Roller . . 4-13
4-15. Replacement of the Exit Guide Roller . . . . . 4-13
4-16. Replacement of the Tension Regulator Band . 4-14
4-17. Replacement of the Tension Regulator Block . . . . . 4-14
4-18. Replacement of the Pinch Roller . . . . . 4-15
4-19. Replacement of the Idler Ass'y . . . . . 4-15
4-20. Replacement of the Idler Pulley . . . . . 4-16
4-21. Replacement of the Micro Switch on the SW-200 Board . . . . . 4-16
4-22. Replacement of the Eject Motor . . . . . 4-17
4-23. Adjustment Item Table after the Main Parts Replacement . . . . . 4-18

## 5. LINK AND DRIVE SYSTEM ALIGNMENT

Alignment Information . . . . . 5-1
5-1. Reel Table Height Adjustment . . . . . 5-3
5-2. Main Brake Clearance Adjustment . . . . . 5-4
5-3. Soft Brake Clearance Adjustment . . . . . 5-4
5-4. Threading Ring Rotation Adjustment . . . . . 5-5
5-5. Gear Ass'y Position Adjustment . . . . . 5-6
5-6. Thread-end Position Adjustment . . . . . 5-7
5-7. Pinch Press Ass'y Position Adjustment . . . . . 5-8
5-8. Tension Regulator Adjustment . . . . . 5-9
5-8-1. Tension Regulator Roller Slantness Adjustment . . . . . 5-9
5-8-2. Tension Regulator Operating Position Adjustment . . . . . 5-10
5-8-3. Pull Rod Ass'y Position Adjustment . . . . 5-11
5-9. Brush Position Adjustment for Slip Ring . . . . 5-12

## 6. BACK TENSION AND TORQUE ALIGNMENT

Alignment Information . . . . . 6-1
6-1. S Soft Brake Torque Adjustment . . . . . 6-3
6-2. T Soft Brake Torque Adjustment . . . . . 6-4
6-3. S Soft Reinforcement Brake Torque Adjustment . . . . . 6-5
6-4. S Main Brake Torque Adjustment . . . . . 6-6
6-5. T Main Brake Torque Adjustment . . . . . 6-7
6-6. FWD Back Tension Adjustment . . . . . 6-8
6-7. FWD Torque Adjustment . . . . . 6-9

## 7. TAPE RUN ALIGNMENT

Alignment Information . . . . . 7-1
7-1. Tape Run Adjustment . . . . . 7-5
7-1-1. Tape Threading Roller Height Adjustment . . . . . 7-5
7-1-2. Tape Run Adjustment (around the Pinch Roller) . . . . . 7-6
7-1-3. Tape Run Adjustment (around the Threading Guide) . . . . . 7-7
7-1-4. Tape Run Adjustment (T Drawer Guide Slantness Adjustment) . . . . . 7-8
7-1-5. Tape Run Adjustment (REV, F.FWD and REW modes) . . . . . 7-9
7-2. Video Tracking Adjustment . . . . . 7-10
7-3. Full Erase Head Adjustment . . . . . 7-12
7-3-1. Full Erase (FE) Head Zenith Adjustment . . . . . 7-12
7-3-2. Full Erase (FE) Head-to-Tape Contact Adjustment . . . . . 7-13
7-4. CTL Head Adjustment . . . . . 7-14
7-4-1. CTL Head Zenith/Azimuth Adjustment . . . . . 7-14
7-4-2. CTL Head Height Adjustment . . . . . 7-15
7-4-3. CTL Head Position Adjustment . . . . . 7-16
7-4-4. CTL Head Phase Check . . . . . 7-17
7-5. Audio/TC Head Adjustment . . . . . 7-18
7-5-1. Audio Head Zenith Adjustment . . . . . 7-18
7-5-2. Audio Head Height Adjustment . . . . . 7-19
7-5-3. Audio Head Phase Adjustment . . . . . 7-20
7-5-4. TC Head Position Adjustment . . . . . 7-21
7-6. Switching Position Adjustment . . . . . 7-22
7-6-1. Video REC Head Switching Position Adjustment . . . . . 7-22
7-6-2. Video PB Head Switching Position Adjustment . . . . . 7-23
7-6-3. Video Confidence Head Switching Position Adjustment . . . . . 7-24
7-7. CTL Delay Adjustment . . . . . 7-25
7-7-1. CTL Delay Adjustment (with Sync) . . . . 7-25
7-7-2. CTL Delay Adjustment (without Sync) . . 7-26
7-8. Video Head Dihedral Adjustment . . . . . 7-27
7-8-1. Video PB Head Dihedral Adjustment . . . 7-27
7-8-2. Video REC Head Dihedral Adjustment . . 7-28

## 8. POWER SUPPLY AND SYSTEM ALIGNMENT


8-1. Battery Meter Calibration Adjustment ..... 8-2
8-2. Battery End Adjustment ..... 8-3


## 9. SERVO SYSTEM ALIGNMENT


9-1. Drum PG Amplifier Adjustment ..... 9-2
9-2. Drum Lock Phase Adjustment ..... 9-2
9-3. $\phi^2$ (Locked Phase) Adjustment ..... 9-2
9-4. Stop Servo Adjustment ..... 9-3
9-5. Capstan Lock Phase Adjustment ..... 9-4
9-6. Instant Start Adjustment ..... 9-4
9-7. $V^2$ Adjustment ..... 9-4
9-8. Composite Shooting Adjustment ..... 9-5
9-9. Picture Splitting Compensator Adjustment .. 9-5


## 10. AUDIO SYSTEM ALIGNMENT


10-1. MIC Amplifier Balance Adjustment ..... 10-3
10-2. Level Volume Reference Position Adjustment ..... 10-3
10-3. 50P Output Level Adjustment ..... 10-3
10-4. Peak Display Adjustment ..... 10-4
10-5. Limiter Adjustment ..... 10-4
10-6. Dolby Input Level Adjustment ..... 10-4
10-7. Audio Level Meter Calibration Adjustment . 10-5
10-8. Audio Confi PB Level Adjustment ..... 10-6
10-9. Confi Cancel Adjustment ..... 10-7
10-10. Warning Level Adjustment ..... 10-7
10-11. Dolby Filter Adjustment ..... 10-8
10-12. Audio Playback Amplifier Frequency Response Adjustment ..... 10-9
10-13. EE Reference Level Adjustment ..... 10-10
10-14. Audio Playback Amplifier Reference Level Adjustment ..... 10-10
10-15. Bias Trap Adjustment ..... 10-10
10-16. Bias Adjustment (1) ..... 10-11
10-17. Bias Adjustment (2) ..... 10-12
10-18. Erase Current Frequency Level Adjustment . 10-12
10-19. OA Frequency Response Adjustment (Oxide) ..... 10-13
10-20. OA Frequency Response Adjustment (Metal) ..... 10-14
10-21. Recording Current Adjustment (Oxide) ... 10-15
10-22. Recording Current Adjustment (Metal) .... 10-15
10-23. Phase Compensation between the CH-1 and CH-2 (Oxide) ..... 10-16
10-24. Phase Compensation between the CH-1 and CH-2 (Metal) ..... 10-16
10-25. AFM Oscillating Frequency Adjustment ... 10-17
10-26. AFM Meter Adjustment ..... 10-17
10-27. AFM Clipper Adjustment ..... 10-18
10-28. AFM Deviation Adjustment ..... 10-19
10-29. AFM Recording Current Adjustment ..... 10-20
10-29-1. AFM Recording Current Adjustment (1) ..... 10-20
10-29-2. AFM Recording Current Adjustment (2) ..... 10-21
10-30. AFM Playback Level Adjustment ..... 10-22


## 11. VIDEO SYSTEM ALIGNMENT


11-1. CCD Adjustment ..... 11-2
11-1-1. CCD Clock Duty Adjustment ..... 11-2
11-1-2. CCD Output Level Adjustment ..... 11-2
11-1-3. CCD Linearity Adjustment ..... 11-3
11-1-4. CCD Output Waveform Flatness Adjustment ..... 11-3
11-2. 100% Color Bars Slice Level Adjustment ... 11-4
11-3. C-REF. Sync Adjustment ..... 11-4
11-3-1. C-REF. Sync Level Adjustment ..... 11-4
11-3-2. 4 Field/15H Pulse Level Adjustment.. 11-5
11-3-3. B-Y Clamp Level Adjustment ..... 11-6
11-3-4. C-REF. Sync Trapezoid Adjustment .. 11-6
11-3-5. C-REF. Sync Position Adjustment (Metal) ..... 11-7
11-3-6. C-REF. Sync Position Adjustment (Oxide) ..... 11-7
11-4. Y-REF. Sync Adjustment ..... 11-8
11-4-1. Y-REF. Sync Level Adjustment ..... 11-8
11-4-2. Y-REF. Sync Trapezoid Adjustment . 11-8
11-4-3. Y-REF. Sync Position Adjustment (Metal) ..... 11-9
11-4-4. Y-REF. Sync Position Adjustment (Oxide) ..... 11-9
11-4-5. Y-REF. Sync Pulse Width Adjustment ..... 11-10
11-5. VITC Level Adjustment ..... 11-10
11-6. High Frequency Pre-emphasis Adjustment .. 11-11
11-6-1. Y-High Frequency Pre-emphasis Bias Adjustment ..... 11-11
11-6-2. Y-High Frequency Pre-emphasis Level Adjustment ..... 11-11
11-6-3. C-High Frequency Pre-emphasis Bias Adjustment ..... 11-11
11-6-4. C-High Frequency Pre-emphasis Level Adjustment ..... 11-12

11-7. Carrier/Deviation Adjustment . . . . . 11-13
11-7-1. Y Carrier/Deviation Adjustment . . . . 11-13
11-7-2. C Carrier/Deviation Adjustment . . . . 11-15
11-8. White/Dark Clip Adjustment . . . . . 11-16
11-8-1. Y Dark Clip Adjustment . . . . . 11-16
11-8-2. Y White Clip Adjustment . . . . . 11-16
11-8-3. C Low Clip Adjustment . . . . . 11-17
11-8-4. C High Clip Adjustment . . . . . 11-17
11-9. HF Adjustment . . . . . 11-18
11-9-1. Y-HF Adjustment . . . . . 11-18
11-9-2. C-HF Adjustment . . . . . 11-18
11-10. Modulator Carrier Balance Adjustment . . . . 11-19
11-10-1. Y Modulator Carrier Balance Adjustment . . . . . 11-19
11-10-2. C Modulator Carrier Balance Adjustment . . . . . 11-19
11-11. PB RF Level Adjustment . . . . . 11-20
11-11-1. Y PB RF Level Adjustment . . . . . 11-20
11-11-2. C PB RF Level Adjustment . . . . . 11-21
11-12. View Finder PB Adjustment . . . . . 11-21
11-12-1. View Finder PB DOC Adjustment . . . 11-21
11-12-2. View Finder PB Output Level Adjustment . . . . . 11-22
11-13. Secondary Distortion Adjustment . . . . . 11-23
11-13-1. Y Secondary Distortion Adjustment . . 11-24
11-13-2. Y SW REC Adjustment . . . . . 11-25
11-13-3. C Secondary Distortion Adjustment . . 11-26
11-13-4. C SW REC Adjustment . . . . . 11-27
11-14. Recording Current Adjustment . . . . . 11-28
11-14-1. Y Recording Current Adjustment (Metal) . . . . . 11-28
11-14-2. C Recording Current Adjustment (Metal) . . . . . 11-30
11-14-3. Y Recording Current Frequency Response Adjustment (Metal) . . . . . 11-32
11-14-4. C Recording Current Frequency Response Adjustment (Metal) . . . . . 11-33
11-14-5. Y Recording Current Adjustment (Oxide) . . . . . 11-35
11-14-6. C Recording Current Adjustment (Oxide) . . . . . 11-37
11-14-7. Y Recording Current Frequency Response Adjustment (Oxide) . . . . . 11-39
11-14-8. C Recording Current Frequency Response Adjustment (Oxide) . . . . . 11-40
11-14-9. Y Overall Frequency Response Adjustment (Oxide) . . . . . 11-42
11-14-10. C Overall Frequency Response Adjustment (Oxide) . . . . . 11-43
11-14-11. Y Overall Frequency Response Adjustment (Metal) . . . . . 11-44
11-14-12. C Overall Frequency Response Adjustment (Metal) . . . . . 11-45
11-15. Y/C Delay Adjustment . . . . . 11-46
11-15-1. Y/C Delay Adjustment (Metal) . . . . . 11-46
11-15-2. Y/C Delay Adjustment (Oxide) . . . . . 11-48

Volume 2

12. BLOCK DIAGRAMS

13. SEMICONDUCTOR ELECTRODES

14. SCHEMATIC DIAGRAMS

15. PRINTED CIRCUIT BOARDS

16. SPARE PARTS AND FIXTURE

# SECTION 1
# TECHNICAL INFORMATION

## 1-1. SPECIFICATIONS

**General**

Power requirements

DC 12 $^{+5}_{-1}$ V

Battery pack NP-1 or

NP-1A (Ni-Cd, 1.5 Ah)

For AC operation: use optional AC-500CE AC power adaptor

Power consumption

14 W

(using a metal particle tape, 12V)

Power save mode: 2 W

Operating temperature

0°C - +40°C

Operating humidity

Less then 85% (relative humidity)

Storage temperature

-20°C - + 60°C

Weight BVV-5PS: 3.4 kg

Battery pack

NP-1, NP-1A: 0.7 kg

BP-90: 1.7 kg

Dimensions 110 x 244 x 223 mm (w/h/d)

(Not incl. projecting parts and controls)

Video cassette

1/2 inch, cassette tape for Betacam format

Metal particle tape

BCT-5M/10M/20M/30M or equivalent

Oxide tape

BCT-5G/10G/20G/30G or equivalent

Tape speed 101.5 mm/sec

Recording time

36 minutes (with BCT-30M)

F.FWD time Less than 5.5 minutes (with BCT-30M)

REW time Less than 3.5 minutes (with BCT-30M)

**Video system** (with standard playback machine)

With a metal particle tape

Bandwidth

Luminance (50%):

25 Hz - 5.5 MHz $^{+0.5}_{-3.0}$ dB

Color difference (50%):

25 Hz - 1.5 MHz $^{+0.5}_{-3.0}$ dB

S/N

Luminance: More than 48 dB

Color difference: More than 48 dB

Y/C delay Less than 20 nsec

Low frequency non-Linearity

Less than 3%

K factor (2T pulse)

Less than 2%

With an oxide tape

Bandwidth

Luminance (50%):

25 Hz - 4.0 MHz $^{+0.5}_{-6.0}$ dB

Color difference (50%):

25 Hz - 1.5 MHz $^{+0.5}_{-3.0}$ dB

S/N

Luminance: More than 46 dB

Color difference: More than 45 dB

Y/C delay Less than 20 nsec

Low frequency non-Linearity

Less than 4%

K factor (2T pulse)

Less than 3%

**Audio system** (with standard playback machine)

Audio channel 1, 2 (LNG)

With a metal particle tape

Frequency response (20 dB below peak level)*1

50 Hz - 15 kHz $^{+1.5}_{-3.0}$ dB

S/N*2 More than 62 dB

Distortion (at 1 kHz)

at peak level*1 Less than 3%

at 0VU level Less than 1.5%

Crosstalk (at 1 kHz) Less than -55 dB

Wow and flutter (DIN 45507)

Less than 0.15%

Depth of erasure (at 1 kHz)

More than 65 dB

With an oxide tape

Frequency response (20 dB below peak level)*1

50 Hz - 15 kHz ±3.0 dB

S/N*2 More than 58 dB

Distortion (at 1 kHz)

at peak level*1 Less than 3%

at 0VU level Less than 2%

Crosstalk (at 1 kHz) Less than -55 dB

Wow and flutter (DIN 45507)

Less than 0.15%

Depth of erasure (at 1 kHz)

More than 65 dB

Audio channel 3, 4 (AFM)

Frequency response (20 dB below peak level)*1

20 Hz - 20 kHz $^{+0.5}_{-2.0}$ dB

S/N*2 More than 68 dB

Distortion (at 1 kHz)

at peak level*1 Less than 3%

at 0VU level Less than 0.6%

Crosstalk (at 1 kHz) Less than -65 dB

*1) Peak level.....AFM:+19VU, LNG:+8VU

*2) referred to peak level, weighted CCIR468-3, with Audio N.R.

**Input**

Video system input (50P) for 100% color bars

Luminance : 1.0 Vp-p, 1 k ohm

Chrominance R-Y: 0.7 Vp-p, 1 k ohm

B-Y: 0.7 Vp-p, 1 k ohm

AUDIO IN CH-1/CH-2/CH-3/CH-4 (XLR, 3P)

: -60 dB/+4 dB selectable, high impedance, balanced

GENLOCK VIDEO IN (BNC)

: 1.0 Vp-p, 75 ohms

TC IN (BNC) : 0.5 - 5 Vp-p, 10 k ohms

**Output**

ENCODE VIDEO OUT (BNC)

: 1.0 Vp-p, 75 ohms

TC OUT (BNC) : 1.0 Vp-p, 75 ohms

---

The input/output level of a component signal conforms to the EBU N-10 standard.

## 1-2. SETTING OF THE SYSTEM SELECT CIRCUIT

Along with the select switches and controls located on the side panel, some internal system select circuits are on the circuit boards.

(1) SLAVE U-BIT (USERS BIT) INT./EXT.
(TC-39P board: JW1, JW2)
Whether the U-BIT is slave-locked by the INT. or the EXT.
INT.: Short the JW1, and open the JW2.
EXT.: Open the JW1, and short the JW2.
When the unit is shipped, it is set to the INT.

(2) REAL TIME VITC/LTC
(TC-39P board: JW3, JW4)
Whether the real time is recorded on the VITC or the LTC.
VITC: Short the JW3, and open the JW4.
LTC : Open the JW3, and short the JW4.
When the unit is shipped, it is set to the VITC.

(3) THE FUNCTIONS OBTAINED BY SETTING OF THE SYSTEM SELECT CIRCUITS, SWITCH SETTING AND TIME CODE SIGNAL
The following functions are obtained by setting the above mentioned select circuits, REAL TIME switch on the side panel, and Time Cord signal.

(i) SLAVE U-BIT: INT.
REAL TIME: VITC
(The unit is set to this state when shipped.)

| REAL TIME switch | EXTERNAL TIME CODE INPUT | U-BIT ON THE VITC | U-BIT ON THE LTC |
|---|---|---|---|
| OFF | OFF | The BVV-5PS's U-BIT information is recorded. | The BVV-5PS's U-BIT information is recorded. |
| | ON | | |
| ON | OFF | The real time information is recorded. | |
| | ON | | |

(ii) SLAVE U-BIT: EXT.
REAL TIME: VITC

| REAL TIME switch | EXTERNAL TIME CODE INPUT | U-BIT ON THE VITC | U-BIT ON THE LTC |
|---|---|---|---|
| OFF | OFF | The BVV-5PS's U-BIT information is recorded. | The BVV-5PS's U-BIT information is recorded. |
| | ON | The external U-BIT information is recorded. | The external U-BIT information is recorded. |
| ON | OFF | The real time information is recorded. | The BVV-5PS's U-BIT information is recorded. |
| | ON | | The external U-BIT information is recorded. |

(iii) SLAVE U-BIT: INT.
REAL TIME: LTC

| REAL TIME switch | EXTERNAL TIME CODE INPUT | U-BIT ON THE VITC | U-BIT ON THE LTC |
|---|---|---|---|
| OFF | OFF | The BVV-5PS's U-BIT information is recorded. | The BVV-5PS's U-BIT information is recorded. |
| | ON | | |
| ON | OFF | | The real time information is recorded. |
| | ON | | |

(iv) SLAVE U-BIT: EXT.
REAL TIME: LTC

| REAL TIME switch | EXTERNAL TIME CODE INPUT | U-BIT ON THE LTC | U-BIT ON THE VITC |
|---|---|---|---|
| OFF | OFF | The BVV-5PS's U-BIT information is recorded. | The BVV-5PS's U-BIT information is recorded. |
| | ON | The external U-BIT information is recorded. | The external U-BIT information is recorded. |
| ON | OFF | The BVV-5PS's U-BIT information is recorded. | The real time information is recorded. |
| | ON | The external U-BIT information is recorded. | |

(4) SETTING OF THE BATTERY NEAR END ALARM

(SS-31P board: S1)

BVV-5PS gives an alarm several minutes before the battery end. The power consumption of the camera and the batteries connected to the BVV-5PS determines the alarm time before the battery end. However, the S1/SS-31P board (three-positioned switch) enables the detection current to be variable, about 1 to 3 minutes before the battery end.

Reference setting of the S1/SS-31P board

| Battery connected to the BVV-5PS / Camera connected to the BVV-5PS | NP-1A | NP-1 | BP-90 | ANTON BAUER BPG5AN |
|---|---|---|---|---|
| BVP-1P, BVP-1S, BVP-5P etc. | 1 = ON<br>2 = OFF<br>3 = OFF | 1 = OFF<br>2 = ON<br>3 = OFF<br>(The unit is set to this state when shipped.) | 1 = OFF<br>2 = ON<br>3 = OFF<br>(The unit is set to this state when shipped.) | 1 = OFF<br>2 = OFF<br>3 = ON |
| BVP-3AP, BVP-3AS, BVP-30AP etc. | 1 = ON<br>2 = OFF<br>3 = OFF | 1 = OFF<br>2 = ON<br>3 = OFF<br>(The unit is set to this state when shipped.) | 1 = OFF<br>2 = ON<br>3 = OFF<br>(The unit is set to this state when shipped.) | 1 = OFF<br>2 = OFF<br>3 = ON |

When the S1-2/SS-31P is set to ON and the NP-1A is used: The alarm time is about 4 to 6 minutes.

When the S1-2/SS-31P is set to ON and the ANTON BAUER BPG5AN is used: The alarm time is about 10 to 20 seconds.

It is recommended to set S1-1 to ON, 2 to OFF, and the 3 to OFF, when not the camera, but the VA-1VP/VA-5P is connected to the BVV-5PS, irrespective of whether the NP-1A, the NP-1, or the BP-90 is used.

(5) COLOR FRAME FLAG CHOICE

(TC-39P board: JW7)

Chose whether the color frame flag is recorded or not.

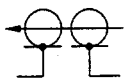
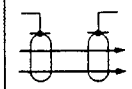
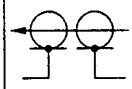
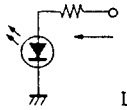
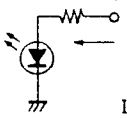
RECORDED : Short the JW7

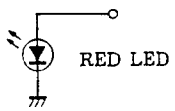
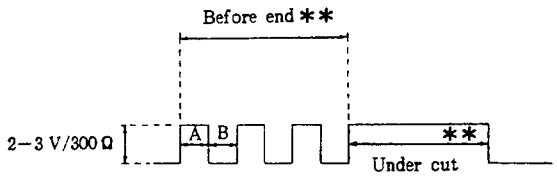
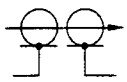
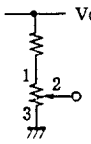
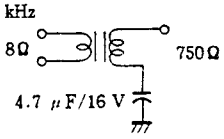
UN-RECORDED: Open the JW7

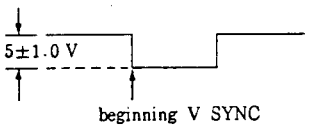
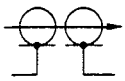
When the unit is shipped, JW7 is opened.

## 1-3. INPUT/OUTPUT SIGNALS OF THE CONNECTORS

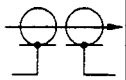
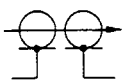
### 1-3-1. 50P Connector

| Pin No. | I/O Signal | Specifications | | |
|---|---|---|---|---|
| | | Camera/VA-5P | Direction | VTR |
| 1 | GENLOCK VIDEO IN | $Z_i$ =1 kΩ±5% |  | VBS=1 Vp-p±3 dB (SYNC negative)<br>$Z_o$ =Low Inpedance |
| 2 | GENLOCK VIDEO (GND) | | | |
| 3 | *+9 V OUT | |  | |
| 4 | ——— | | | |
| 5 | GND (Power) | |  | |
| 6 | GND (Power) | |  | |
| 7 | ——— | | | |
| 8 | ——— | | | |
| 9 | ——— | | | |
| 10 | ——— | | | |
| 11 | ——— | | | |
| 12 | ——— | | | |
| 13 | ——— | | | |
| 14 | ——— | | | |
| 15 | MIC (GND) | −60 dBm<br>$Z_o$ =Low Impedance<br>(600 Ω or less)<br>Balanced |  | $Z_i$ =3 kΩ~10 kΩ<br>Balanced |
| 16 | MIC (X) | | | |
| 17 | MIC (Y) | | | |
| 18 | PB VIDEO | $Z_i$ =1 kΩ±5% |  | VS=1 Vp-p±1 dB<br>DC: 0±200 mV<br>$Z_o$ =75 Ω±5% |
| 19 | GND | | | |
| 20 | *AUDIO LEVEL INDICATE | $Z_i$ ≧1 kΩ |  | $Z_o$ ≦30 Ω<br>−15 dBs±1 dB (Reference) CH-1 only |
| 21 | ——— | | | |
| 22 | TAPE IND.1 (10M) |  <br>Imax=10 mA |  | H=4.5 V±0.5 V (Camera side open)<br>L=0 V $^{+0.5\ V}_{-0\ V}$<br>$Z_o$ =330 Ω±5% |
| 23 | TAPE IND.2 (5M) |  <br>Imax=10 mA |  | H=4.5 V±0.5 V (Camera side open)<br>L=0 V $^{+0.5\ V}_{-0\ V}$<br>$Z_o$ =330 Ω±5% |

| Pin No. | I/O Signal | Specifications | | |
|---|---|---|---|---|
| | | Camera/VA-5P | Direction | VTR |
| 24 | REC/TALLY | $Z_i$ =20 kΩ | ← | 5.0 $^{+1.0\ V}_{-0.5\ V}$, 2.5±0.5 V, 0±0.3 V; A B; Warning Alarm; REC; REC Reset 10~100 mS; VTR Connected; VTR Disconnected<br>A/B: 50±10% duty frequency 1±0.2 Hz or 4±0.8 Hz |
| 25 | BATT IND | $Z_i$ =300 Ω<br>RED LED<br>  | ← |  <br>14.5 Vmax open, 2~3 V with 300 ohms load<br>A/B: 50+10% duty frequency 1±0.2 Hz or 4±0.8 Hz<br>**Before end: 11.45 V<br>Under cut: 11.0 V |
| 26 | *PB/CAM SWITCH CONTROL | $Z_i$ =100 kΩ±5% | ← | 4.5±0.5 V<br>$Z_o$ =10 kΩ±5% L: OPEN |
| 27 | VTR START/ STOP | 5±1.0 V<br>$Z_o$ ≦10 kΩ<br>START 5±1.0 V<br>STOP 0 $^{+0.2\ V}_{-0.1\ V}$ | → | START 5 $^{+0.3\ V}_{-1.0\ V}$<br>STOP 0 $^{+0.5\ V}_{-0\ V}$ or OPEN |
| 28 | ——— | | | |
| 29 | R-Y VIDEO | V=0.7 Vp-p±2%<br>(100% color bars)<br>$Z_o$ =75 Ω±5%<br>DC: 0±200 mV |  | $Z_i$ =1 kΩ±5% |
| 30 | R-Y (GND) | | | |
| 31 | *AUDIO CH-1 CONTROL | Control Voltage<br>7 V (MIN LEVEL)<br>↕<br>0 V (MAX LEVEL)<br>  | → | $Z_i$ ≧100 kΩ<br>0 V or OPEN: MAX LEVEL<br>7 V: MIN LEVEL |
| 32 | VTR SAVE | 4.5±0.5 V<br>(STAND BY: 0 V or open)<br>$Z_o$ ≦10 kΩ | → | $Z_i$ ≧100 kΩ<br>VTR should be in SAVE mode when camera is in PREHEAT |
| 33 | AUDIO MONITOR | 750 Ω/1 kHz<br>  | ← | Low Impedance<br>Level: −6 dBs |
| 34 | SYNC (⌐└⌐) | $V_{OH}$ =5 $^{+0.2\ V}_{-1.0\ V}$, $I_{OH}$ =1 mAmax<br>$V_{OL}$ =0.8 Vmax,<br>$I_{OL}$ =−1.5 mAmax | → | This signal should be in $V_{OL}$ when SYNC OFF. |

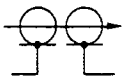
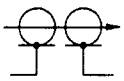
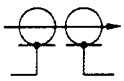
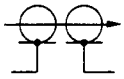
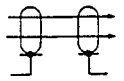
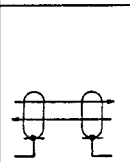
| Pin No. | I/O Signal | Specifications | | |
|---|---|---|---|---|
| | | Camera/VA-5P | Direction | VTR |
| 35 | ——— | | | |
| 36 | *REW CONTROL | $Z_i$ =100 kΩ±5% | ← | REW: 4.5±0.5 V<br>NORMAL: 0±0.5 V<br>$Z_o$ ≦10 kΩ |
| 37 | COLOR FRAMING (⌐¬⌐) |  <br>NTSC: 1st Field (every 4 fields) V.SYNC/3H PULSE<br>PAL: 1st Field (every 8 fields) V.SYNC/2.5 H PULSE<br>PAL M: 1st Field (every 8 fields) V.SYNC/3 H PULSE<br>$Z_o$ =1 kΩ±5%<br>DC OUT C≧10 μF | → | $Z_i$ ≧100 kΩ |
| 38 | *RETURN CONTROL | NORMAL: OPEN<br>RETURN : 0 V | → | $Z_i$ ≧10 kΩ |
| 39 | +12 V (Power) | | ← | |
| 40 | +12 V (Power) | | ← | 10.6 Vmin (at 3A), 14.5 Vmax |
| 41 | LUMINANCE | VS=1 Vp-p±0.5 dB<br>DC: 0±200 mV<br>$Z_o$ =75Ω±5%<br>SET UP NTSC PAL-M: 7.5%<br>PAL : 0% |  | $Z_i$ =1 kΩ±5% |
| 42 | LUMINANCE (GND) | | | |

| | NTSC | PAL<br>PAL-M<br>SECAM |
|---|---|---|
| VIDEO | 0.714 Vp-p | 0.7 Vp-p |
| SYNC | 0.286 Vp-p | 0.3 Vp-p |

| | | | | |
|---|---|---|---|---|
| 43 | *ENCODE VIDEO | VBS=1 Vp-p±1 dB<br>$Z_o$ =75Ω±5%<br>DC: 0±100 mV |  | $Z_i$ =75Ω±5% |
| 44 | *GND | | | |
| 45 | ——— | | | |
| 46 | ——— | | | |
| 47 | ——— | | | |
| 48 | ——— | | | |
| 49 | B-Y VIDEO | V=0.7 Vp-p±2%<br>$Z_o$ =75Ω±5%<br>DC: 0±200 mV<br>(100% color bars) |  | $Z_i$ =1 kΩ±5% |
| 50 | B-Y (GND) | | | |

* marked signals are available only when a camera is connected.

## 1-3-2. 20P Connector for PB Adaptor, VA-500P

| Pin No. | I/O Signal | VTR | Direction | PB ADAPTOR |
|---|---|---|---|---|
| 1 | YA, B RF (X) | 75Ω DC=0 V<br>OXIDE=0.1 Vp-p<br>METAL=0.2 Vp-p<br>(Center Carrier) |  | Low Impedance |
| 2 | YA,B RF (G) | | | |
| 9 | ENCODE VIDEO (X) | |  | Z=75Ω<br>1 Vp-p |
| 10 | ENCODE VIDEO (G) | | | |
| 20 | CA RF (X) | 75Ω DC=0 V<br>OXIDE=0.1 Vp-p<br>METAL=0.2 Vp-p<br>(Center Carrier) |  | Low Impedance |
| 19 | CA RF (G) | | | |
| 12 | CB RF (X) | 75Ω DC=0 V<br>OXIDE=0.1 Vp-p<br>METAL=0.2 Vp-p |  | Low Impedance |
| 11 | CB RF (G) | | | |
| 3 | AUDIO CH1 PB (X) | Low Impedance<br>−10 dBs<br>ENCODED: DOLBY ON, PB<br>UNENCODED: DOLBY OFF, EE/REC, PB |  | Z=10 kΩ |
| 5 | AUDIO CH2 PB (X) | | | |
| 4 | AUDIO PB (G) | | | |
| 16 | Y RF SW PULSE (X) | A CH: H<br>B CH: L<br>Open collector |  | Z≧10 kΩ |
| 18 | ADVANCE SYNC (X) | Z=75Ω | | 2±0.5 Vp-p, 75Ω |
| 15 | ADVANCE SYNC (G) | | | |
| 6 | CONTROL SIG. 1 | METAL "H"<br>METAL OR OXIDE, FF/REW MODE "M"<br>OXIDE "L"<br>H=5.0 V<br>M=2.5 V<br>L=0 V |  | High Impedance |
| 17 | CONTROL SIG. 2 | PLAY: HIGH<br>Z=10 kΩ |  | Z=10 kΩ |
| 7 | GND | |  | |
| 8 | GND | |  | |
| 13 | +12 V | |  | |
| 14 | +12 V | |  | |

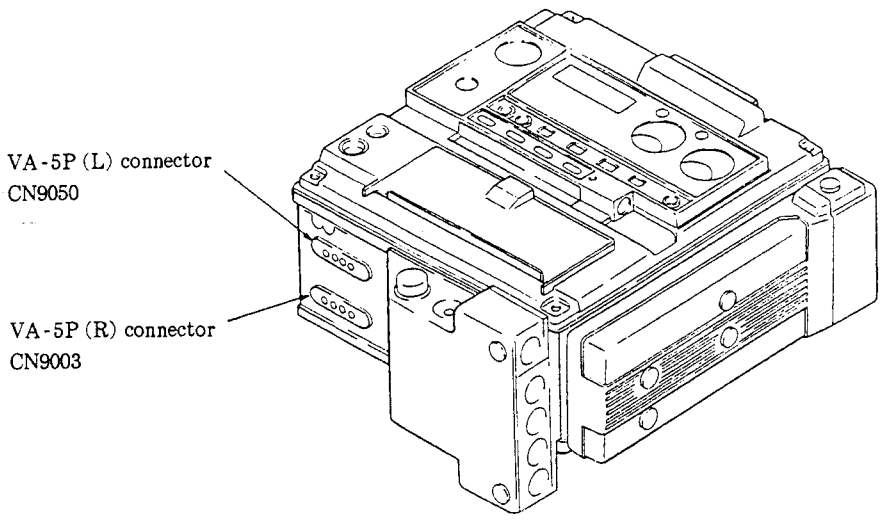
## 1-3-3. 4P Connector for Component/Composite Adaptor, VA-5P

CN9003

| Pin No. | I/O Signal | VTR | Direction | VA-5P |
|---|---|---|---|---|
| 1 | LNG (CH1/2)/ AFM (CH3/4) SELECT | Z≧100 kΩ | ← | CH1/CH2 Select H=5±0.5 V<br>CH3/CH4 Select L=$0^{+0.5}_{-0}$ V<br>Z o =10 kΩ |
| 2 | EE/PB SELECT | Z≧100 kΩ | ← | PB Select H=5±0.5 V<br>EE Select L=$0^{+0.5}_{-0}$ V<br>Z o =10 kΩ |
| 3 | MONITOR SELECT 1 | Z≧100 kΩ | ← | CH1/CH3 Select L=$0^{+0.5}_{-0}$ V<br>MIX Select H=5±0.5 V |
| 4 | MONITOR SELECT 2 | Z≧100 kΩ | ← | CH2/CH4 Select L=$0^{+0.5}_{-0}$ V<br>MIX Select H=5±0.5 V |

CN9050

| | | | | |
|---|---|---|---|---|
| 1 | IDENTIFICATION SIG OF VA-5P | Z≧10 kΩ | ← | High level<br>V=5±0.5 V<br>Z o ≦10 kΩ |
| 2 | CH1/CH3 AUDIO LEVEL | Low Impedance<br>0 VU=−6 dBs | → | Z≧10 kΩ |
| 3 | CH2/CH4 AUDIO LEVEL | Low Impedance<br>0 VU=−6 dBs | → | Z≧10 kΩ |
| 4 | ——— | | | |



## 1-4. CONNECTION CONNECTOR

When external cables are connected to the connectors on the connector panel during maintenance, the hardware listed below (or equivalents) must be used.

| Panel indication | Connection connector |
|---|---|
| AUDIO IN | 1-508-084-00<br>CONNECTOR, XLR, 3P, MALE |
| DC IN | 1-508-362-00<br>PLUG, XLR, 4P, FEMALE |
| CAMERA | 1-562-112-21<br>CONNECTOR, 50P, MALE |
| TC IN | 1-560-069-11<br>PLUG, BNC, MALE |
| TC OUT | |
| GENLOCK VIDEO IN | 1-560-069-11<br>PLUG, BNC, MALE |
| ENCODE VIDEO OUT | |
| PB ADAPTOR | 1-566-771-11<br>PLUG, 20P, MALE |

## 1-5. SUPPLIED ACCESORIES

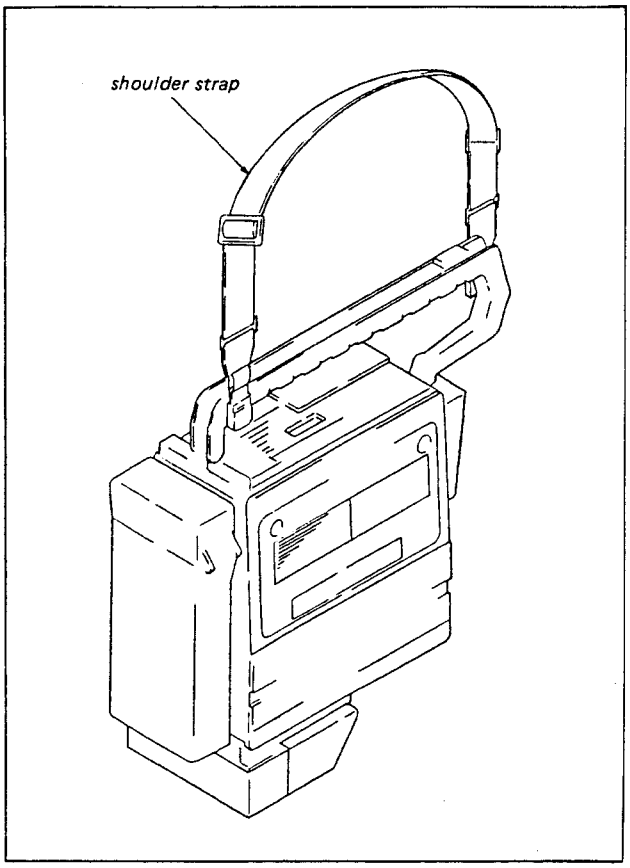
Supplied BVV-5PS accessories are as follows:

(1) Shoulder Strap
The shoulder strap can be attached to the BVV-5PS. Both ends of the strap are attached to the knob on the unit easily.

(2) 50P Connector Cap
The 50P connector cap is used for the prevention of dust and rain. Use this cap when BVV-5PS is stored or used without connecting something to it.

(3) 4P Connector Cap
The 4P connector cap is used for the prevention of dust and rain. Use this cap when BVV-5PS is stocked or used without connecting the VA-5P to the unit.

(4) M4 Screw
Install the camera handle to two bosses on the VTR for the protection from rain or dust. When the VTR handle is used as shown in the figure, screw them to the camera handle boss to protect the unit.



## 1-6. OPTIONAL ACCESSORIES

The following are the accessories. Use the suitable accessory according to the need.

(1) Color Video Camera: BVP-5P
This is the 3-chip CCD portable camera. The "BETACAM SP" system can be composed by the BVV-5PS with the BVP-5P.

(2) Battery Pack: NP-1
BP-90
They are the chargeable 12V battery pack. NP-1's capacity is 1.5 AH, and that of the BP-90 is 3.5 AH.

(3) Battery Charger: BC-1WACE
BC-210CE
The BC-1WACE Battery Charger is designed to charge NP-1 battery packs. Four NP-1 battery packs can be inserted at one time, and willl be charged in sequence automatically.
The BC-210CE Battery Charger is designed to charge BP-90 battery packs. Four BP-90 battery packs can be inserted and charged at one time automatically.

(4) AC Adaptor: AC-500CE
The BVV-5PS can be driven by an AC power source from the AC adaptor, AC-500CE. The AC-500CE is worldwide type of adaptor. AC-500CE can be used with 100/120/220/240V commercial power supplies just by setting the voltage selector to the appropriate position for a stable supply of dc power.

(5) Earphone: ME-20B
The audio simultaneous playback sound (mixed sound of CH-1 and CH-2) in the REC mode can be monitored by connecting this ME-20B with BVV-5PS.
In other modes (except REC mode), the selected EE sound (selected by AUDIO IN and CH SELECT) can be monitored.

(6) Wireless Microphone System
UHF portable tuner: WRR-27
Transmitter: WRT-27/-27A
Wireless Microphone: WRT-57
The audio sound can be recorded on the tape without wire cable by using these wireless microphone systems.

(7) Battery Case: DC-500
The battery case, DC-500 is for the battery pack, BP-90. This can be replaced for the DC-500, which is one of supplied accessories.
DC-500 can be attached to the VTR easilly.

(8) Playback Adaptor: VA-500P
Connecting the VA-500P and the BVV-5PS, the color playback picture can be obtained. Either the composite signal or the VHF RF signal can be output.

(9) VTR Component / Composite Adaptor: VA-5P
The VA-5P can be have either component signal or composite signal input. It also has the REC switch on it. By connecting the VA-5P, the BVV-5PS can be used with the conventional cameras.

## 1-7. USE UNDER SPECIAL ENVIRONMENT (MEASURE FOR COLD AREA)

The BVV-5PS is guaranteed to operate between the temperature of $0^{\circ}C$ to $40^{\circ}C$.
When the unit is used out of the above temperature, cover-cloth against the cold is recommended.

## 1-8. REMOVAL AND INSTALLATION OF THE VTR AND CAMERA

(1) Removal

(i) Remove the screw shown in the figure with a suitable coin (or screwdriver).

(ii) Move the VTR in the opposite direction to the arrows, and dissassemble it.

(2) Installation

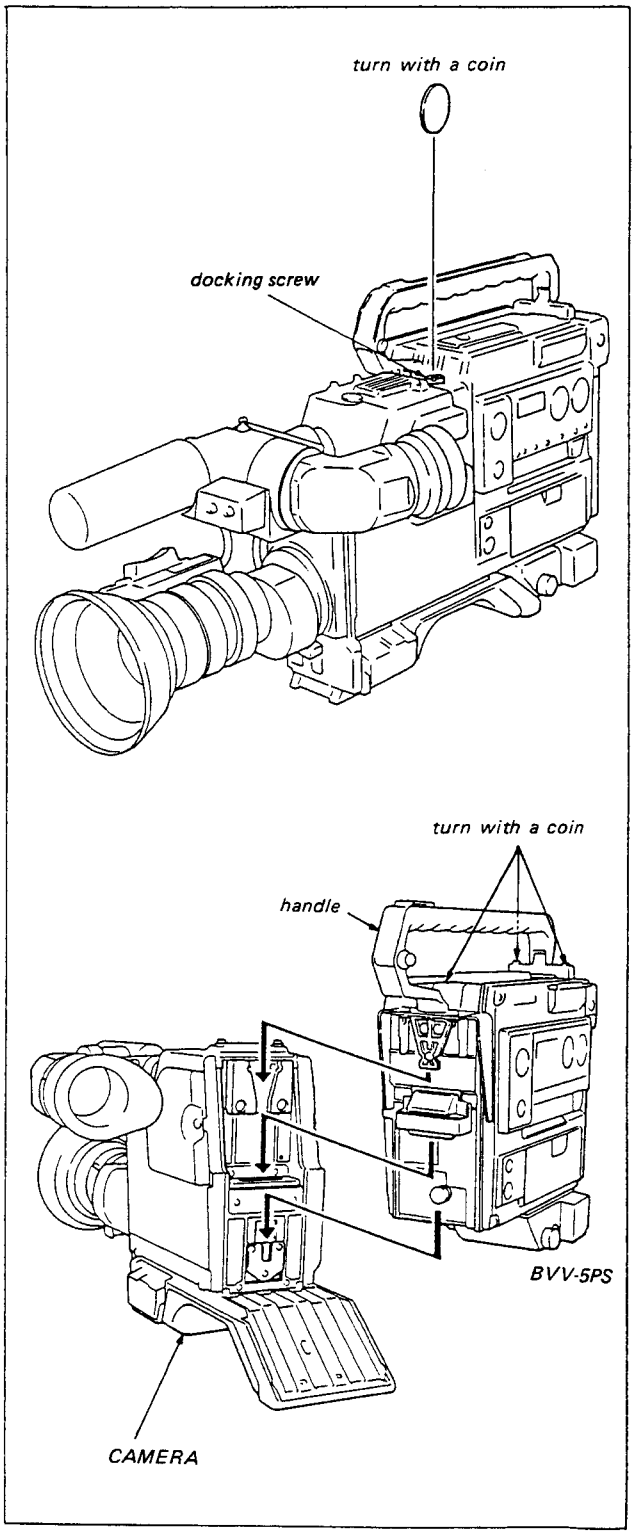
(i) Move the VTR in the direction of the arrows, and assemble them. If the 50P connector of the VTR will not mate correctly with the camera, slightly move the connector of the VTR by hand.

(ii) Tighten the screw.

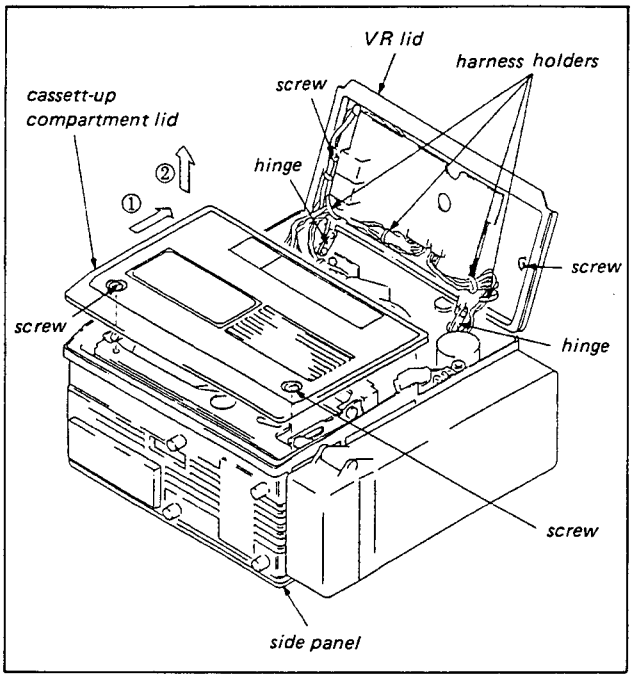
(3) Handle Position

(i) Install the camera and the VTR. Unscrew with a coin the fixing screw of the handle.

(ii) Install the handle as shown in the figure and tighten the fixing screws.



## 1-9. REMOVAL OF LIDS AND THE PANEL




. **Side Panel**

. Loosen the four fixing screws and open the side panel. Never remove these screws from the side panel.

. When installing the side panel, be sure not to pinch a harness between the panel and the chassiss.

. **VR Lid**

. Loosen the two fixing screws, and open the VR lid. Never remove these screws from the VR lid.

. When installing, tighten the harness holders. Be sure not to damage on the brush on the drum and so on.

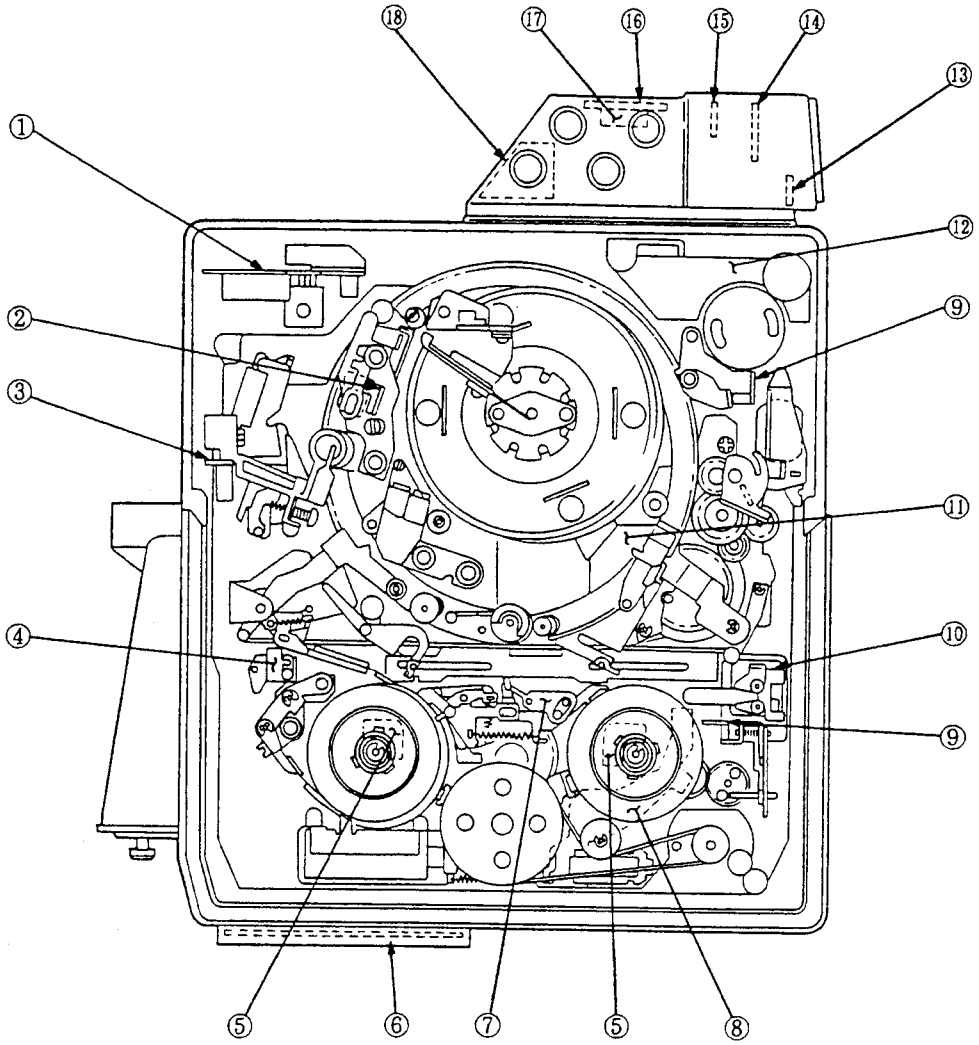
. **Cassette-up Compartment Lid**

. Loosen the two fixing screws, and move cassette-up compartment lid in the direction of the arrows ① and ②. Remove the cassette-up compartment lid. Never remove these screws from cassette-up compartment lid.

. When installing, move the lid to the opposite direction of the arrows ② and ① so that the projection of the cassette-up compartment is inserted into the hole of the lid.

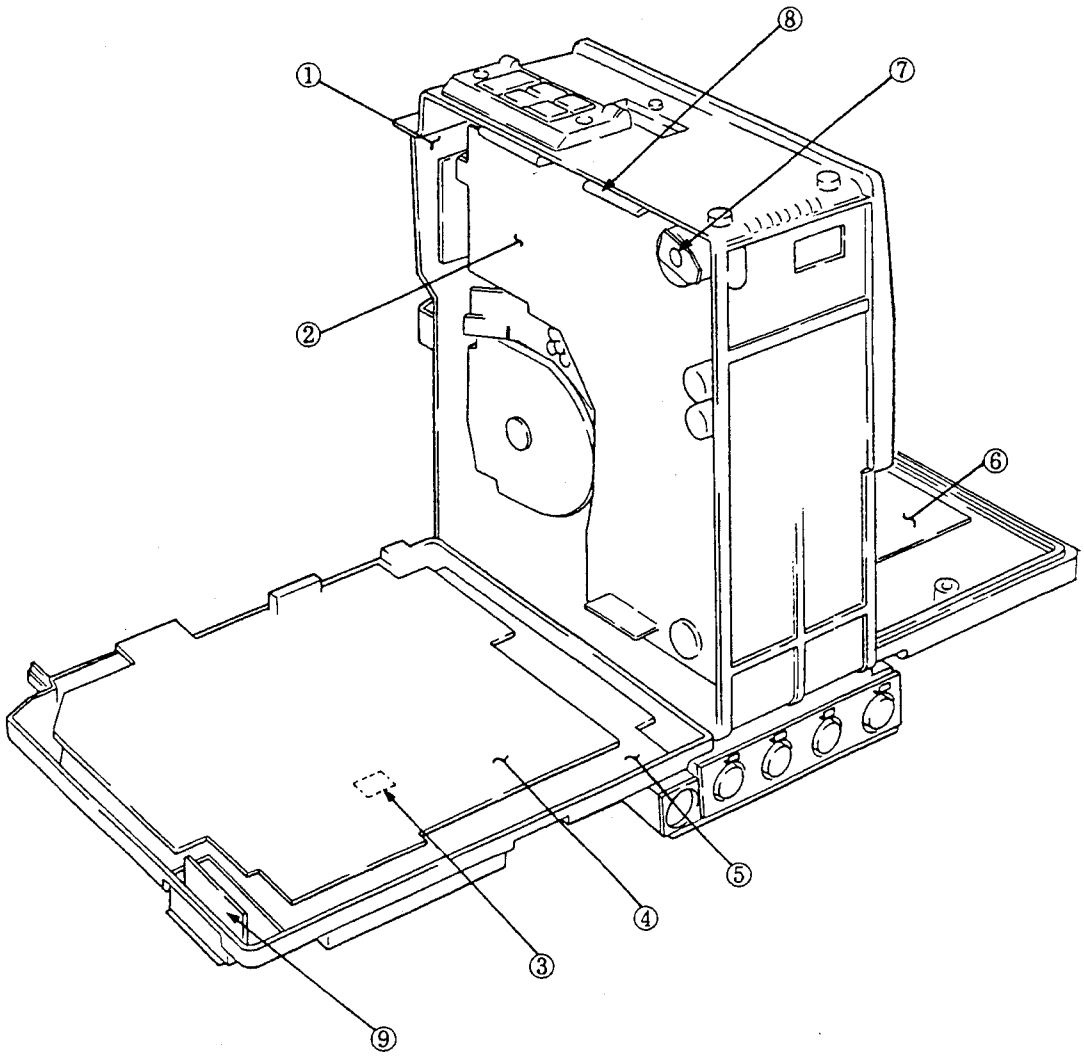
## 1-10. MAIN PARTS LOCATION

### 1-10-1. Location of the Printed Circuit Boards ( I )



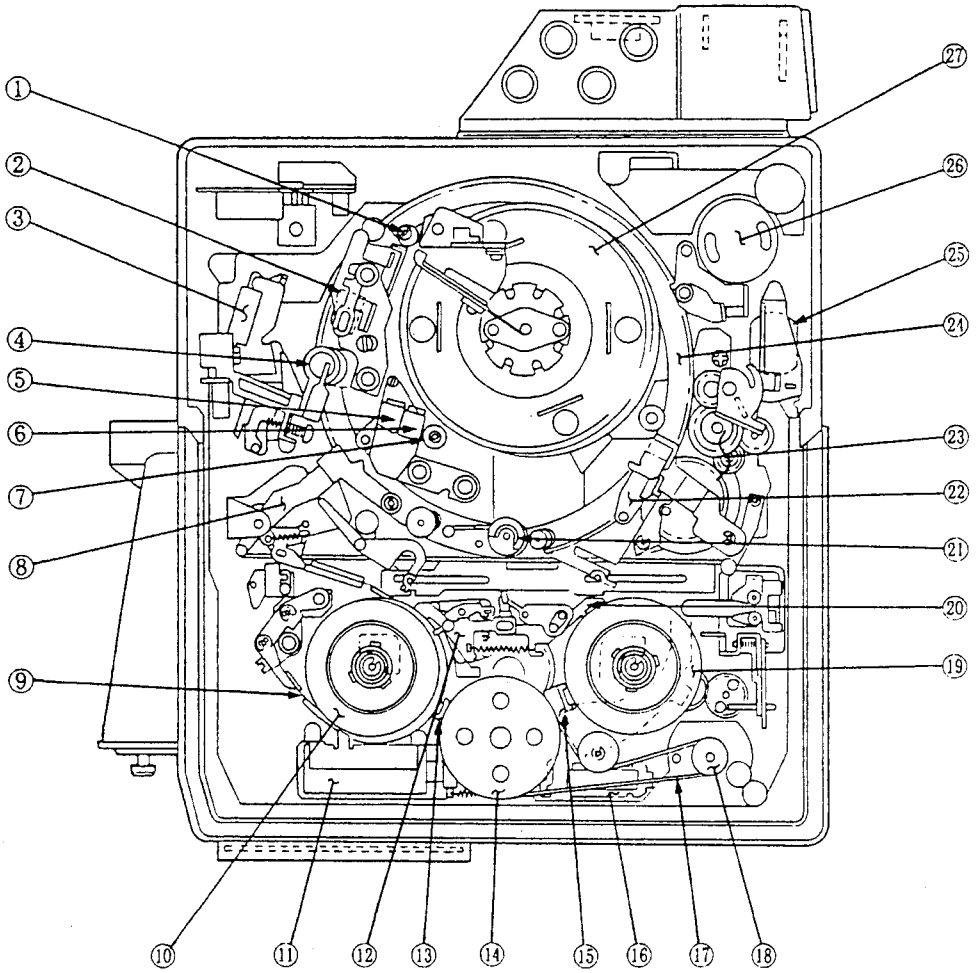

| | |
|---|---|
| ① DR-48 | ⑪ SE-30 |
| ② PA-53 | ⑫ DD-5P |
| ③ SE-60 | ⑬ SW-223 |
| ④ SW-192 | ⑭ DD-10 |
| ⑤ PTC-11 | ⑮ DC-27 |
| ⑥ KY-94 | ⑯ CN-121 |
| ⑦ CT-73 | ⑰ SW-131 |
| ⑧ CM-20 | ⑱ DUS-182 |
| ⑨ SW-200 | |
| ⑩ SW-201 | |

(II)



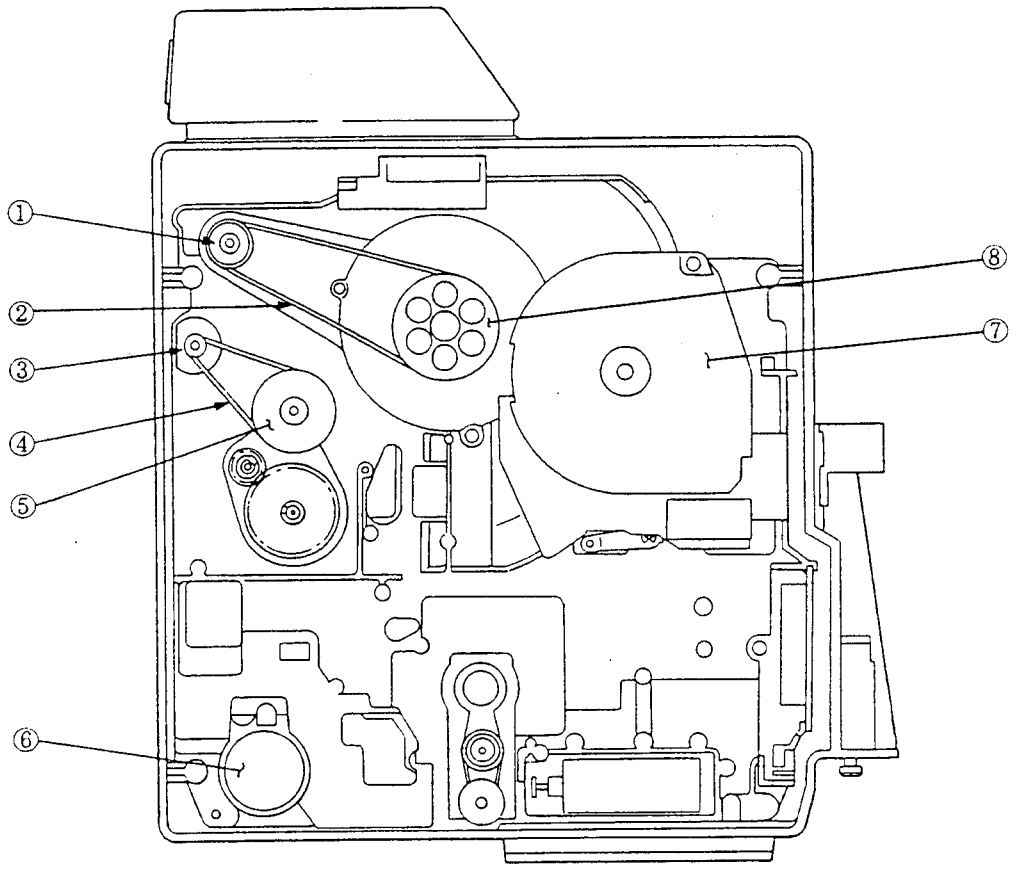

| | |
|---|---|
| ① CN-142 | ⑥ AU-72P |
| ② SS-31P | ⑦ RM-49 |
| ③ HP-34 | ⑧ FL-38 |
| ④ VA-52P | ⑨ CT-85 |
| ⑤ TC-39P | |

## 1-10-2. Location of the Main Mechanical Parts / Components ( I )



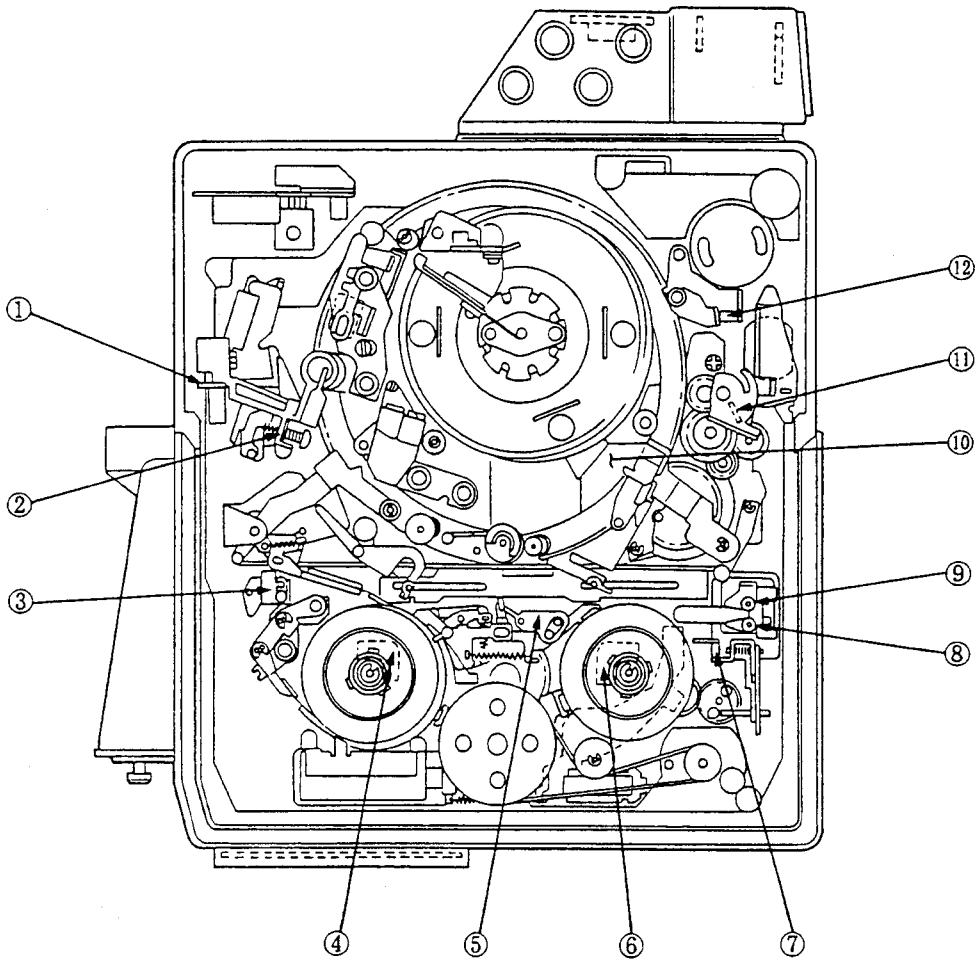

| | | | |
|---|---|---|---|
| ① | Tape Guide (TG-II) | ⑮ | Take-up side Main Brake |
| ② | Audio / TC / Audio Conf. Heads | ⑯ | Eject Motor |
| ③ | Pinch Solenoid | ⑰ | Mechanical Belt (for Reel Drive) |
| ④ | Capstan Shaft | ⑱ | Reel Motor Pulley |
| ⑤ | Full Erase Head | ⑲ | Take-up Side Reel Table |
| ⑥ | CTL Head | ⑳ | Take-up side Soft Brake |
| ⑦ | Tape Guide (TG-I) | ㉑ | Pinch Roller |
| ⑧ | Tension Regulator | ㉒ | Slant Guide |
| ⑨ | Tension Regulator Band | ㉓ | Gear Block |
| ⑩ | Supply-side Reel Table | ㉔ | Threading Ring |
| ⑪ | Break Solenoid | ㉕ | Threading Motor |
| ⑫ | Supply-side Soft Brake | ㉖ | Drum Motor |
| ⑬ | Supply-side Main Brake | ㉗ | Head Drum |
| ⑭ | Idler Pulley | | |

(II)




① D Motor Pulley
② Drum Belt
③ Threading Motor Pulley
④ Threading Motor Belt
⑤ Deceleration Pulley
⑥ Reel Motor
⑦ Capstan Motor
⑧ Drum Pulley

## 1-10-3. Location of Micro Switches and Sensors




① Tension Regulator Arm Position Detector (SE-60 Board)
② Tape End Sensor
③ REC Inhibit Switch for Metal Particle Tape (SW-192 Board)
④ Supply Reel Rotation Detector (PTC-11 Board)
⑤ Metal / Oxide Selector (CT-73 Board)
⑥ Take-up Reel Rotation Detector (PTC-11 Board)
⑦ Cassette-up Compartment Lock Switch (SW-200 Board)
⑧ Cassette-in Switch (SW-201 Board)
⑨ REC Inhibit Switch for Oxide Tape(SW-201 Board)
⑩ Mechanical Function Control Sensor (SE-30 Board)
⑪ Tape Beginning Sensor
⑫ Unthread end Switch (SW-200 Board)

## 1-11. PRINTED CIRCUIT BOARD

Circuit imformation is provided below.

| SYSTEM | BOARD | CIRCUIT FUNCTION |
|---|---|---|
| VIDEO | VA-52P | Video System |
| | DUS-194 | |
| AUDIO | VA-52P | AFM System, Dolby Process |
| | TC-39P | Audio Amplifier |
| | DUS-194 | |
| | AU-72P | Audio REC Amplifier |
| | CT-85 | Audio Level Control |
| | HP-34 | Earphone Jack |
| | PA-53 | CONFL./PB Amplifier |
| TIME CODE | TC-39P | Time Code Generator/Reader |
| SERVO | SS-31P | Servo System |
| | DUS-245 | Regulator |
| | DD-5P | Drum Motor Driver |
| SYSTEM CONTROL | PTC-11 | Supply / Take-up Reel Rotation Detector |
| | RM-49 | Reel Motor Driver |
| | CM-20 | Eject Motor |
| | DR-48 | Pinch / Brake Solenoids and Threading Motor Driver |
| | SS-31P | System Control System |
| | KY-94 | Function Key / Display |
| | CT-73 | Metal / Oxide Selector |
| | SE-30 | Mechanical Function Control Sensor |
| | SE-60 | Tension Regulator Release |
| | SW-192 | REC Inhibit Switch for Metal Tape |
| | SW-200 | Cassette-up Compartment Lock / Unthreading-end Switch |
| | SW-201 | Cassette-in Switch / REC Inhibit Switch for Oxide Tape |
| POWER SUPPLY | CN-121 | DC Input Relay |
| | DC-27 | External DC Back-up |
| | DD-10 | Phantom DC-DC Converter |
| | DUS-182 | Ripple Filter |
| | SW-131 | Breaker |
| | SW-223 | Phantom ON / OFF Switch |
| OTHERS | CN-142 | 50 pin / Flexible Board |
| | FL-38 | Flexible Harness Board |
| | PA-67 | REC/PB Amplifier |

# SECTION 2
# PERIODIC CHECK AND MAINTENANCE

## 2-1. MAINTENANCE TIME TABLE

| Item \ Operating hours (H) / Replacement Part No. | 500 | 1,000 | 1,500 | 2,000 | 2,500 | 3,000 | 3,500 | 4,000 |
|---|---|---|---|---|---|---|---|---|
| Cleaning of the tape movement area | ——— | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Cleaning or replacement of the belt | 3-717-908-01 Belt, reel<br>3-717-910-01 Belt, drum<br>3-717-921-01 Belt, L Motor | ○ | ○ | ○ | ◆ | ○ | ○ | ○ | ◆ |
| Cleaning or replacement of the pinch roller | X-3676-031-0 | ○ | ○ | ○ | ◆ | ○ | ○ | ○ | ◆ |
| Cleaning or replacement of the upper drum | A-6762-334-A | ○ | ◆ | ○ | ◆ | ○ | ◆ | ○ | ◆ |
| Check of the FWD/Back tension (replacement of the tension regulator band) | X-3717-736-1 | — | ◇ | — | ◇ | — | ◆ | — | ◇ |
| Check the S/T main brake torque (replacement of the brake shoe) | S: X-3717-740-1<br>T: X-3717-741-1 | — | ◇ | — | ◇ | — | ◆ | — | ◇ |
| Check the S/T soft brake torque (replacement of the brake shoe) | S: X-3717-734-1<br>T: X-3717-735-1 | — | ◇ | — | ◇ | — | ◆ | — | ◇ |

○ = Cleaning　　◇ = Check　　◆ = Replacement

## 2-2. MAINTENANCE

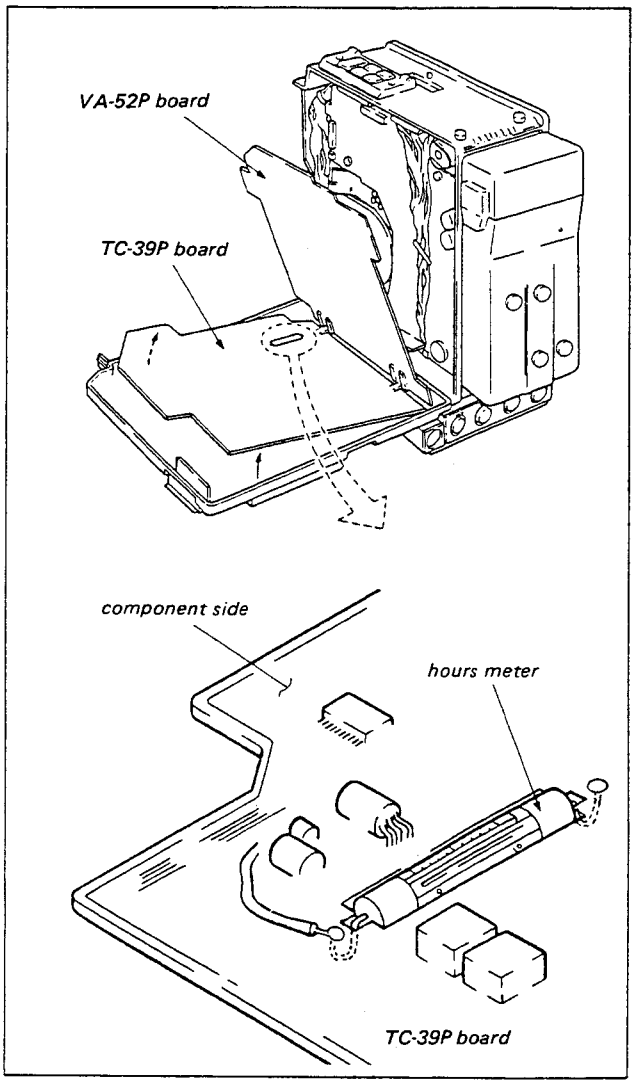
It is recommended that the following periodic check and maintenance schedule be employed in order to obtain maximum performance and longer tape life from the BVV-5PS.

### 2-2-1. Hours Meter

The BVV-5PS has an hours meter on the TC-39P board. This hours meter accumulates and records the operating time of the drum.

It is recommended that the hours meter is used as a tool for determining the periodic check.

When the hours meter indicates the maximum, 1000 hours, the hours meter must be replaced with a new one. (Sony parts number; 1-548-119-21)



## 2-3. MAINTENANCE AFTER THE REPAIRS

Perform the following maintenance after repair without regarding the machine operating hours.

1. Video heads and stationary heads cleaning.
   (Refer to the sec. 2-4.)
2. Tape movement area cleaning.
   (Refer to the sec. 2-4-4.)

## 2-4. CLEANING PROCEDURE

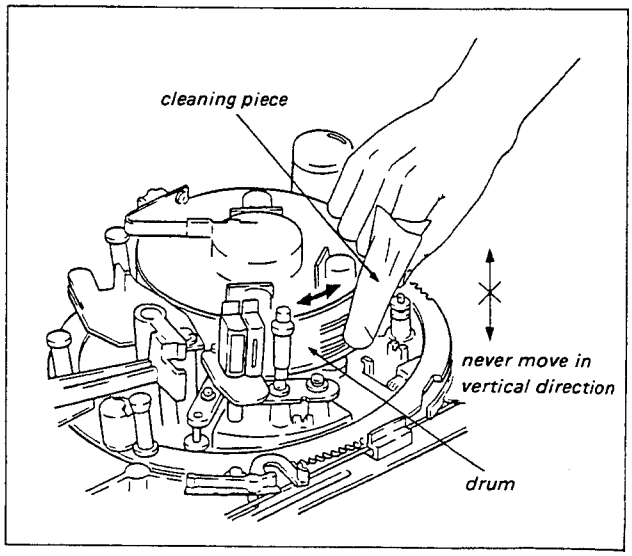
Cleaning procedure is as follows. Be sure not to insert a cassette tape before the cleaning fluid evaporates completely.

### 2-4-1. Video Head

Press the cleaning piece moistened with the cleaning fluid and turn the drum slowly with hand.

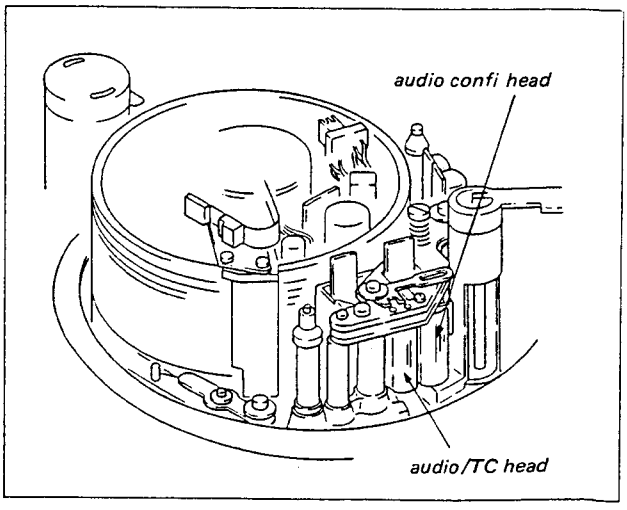
(NOTE) 1. Never move the cleaning piece in the vertical direction of the head tip when cleaning.

2. Perform the cleaning with the power Off.



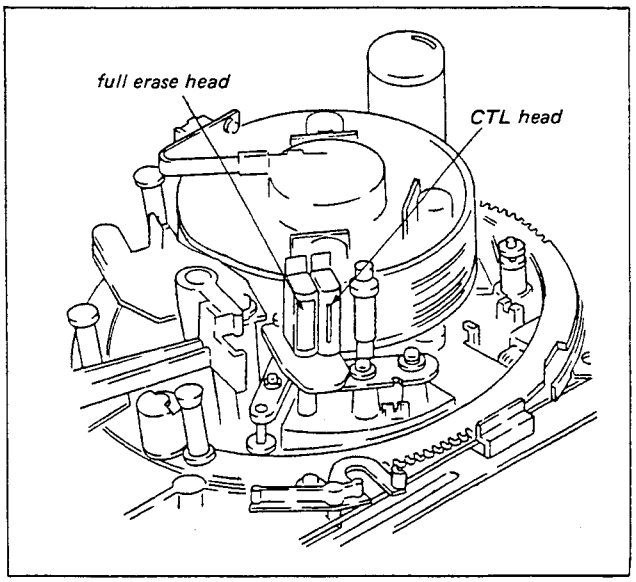

### 2-4-2. Audio/TC, Audio Confidence Heads

Clean with the cleaning piece moistened with the cleaning fluid.



### 2-4-3. CTL, FE(Full Erase) Heads

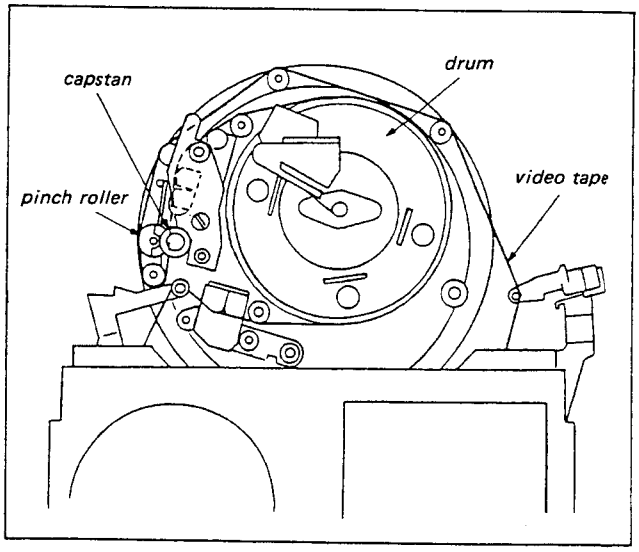
Clean with the cleaning piece moistened with the cleaning fluid.




### 2-4-4. Tape Movement Areas

Clean with the cleaning piece moistened with the cleaning fluid; Tape guides, drum, capstan and the pinch roller as shown in the figure.

(NOTE) Do not clean the surface of the condensation sensor on the lower drum with the moistened cleaning piece. Clean it with a dry cloth.



## 2-5. AFTER EXPOSURE TO SAND OR DUST

It is recommended to check the following items after the BVV-5PS is exposed to sand or dust.

(1) Clean off the sand or dust in the BVV-5PS with a cleaning piece moistened with cleaning fluid, or carefully blow it off with an air-brush.
(2) Clean the video head and stationary heads with a cleaning piece moistened with cleaning fluid.
(3) Clean the tape movement areas (the drum surface, tape guides, capstan shaft and the pinch roller) with a cleaning piece moistened with cleaning fluid.
(4) Clean the belts located on both sides of chassis.
(5) Clean the surface of the reel tables contact with the brake shoes.
(6) Rotate the tape guides, pulley, capstan and the pinch roller by hand, and check for any abnormal noises. If there are any abnormal noises, replace the part immediately.
(7) After the BVV-5PS is used at seaside, remove the printed circuit board (refer to the sec. 3-3). Clean the printed circuit board with a cleaning piece moistened with cleaning fluid after blow off sand on the completely. Clean the soldering side in the same manners.
(8) Clean the connector on the connector panel completely. (Disconnect and clean each pin.)
(9) Perform the operation check and be sure that the machine operates normally.

# SECTION 3
# SERVICE INFORMATION

## 3-1. REMOVAL AND INSTALLATION OF THE VTR AND CAMERA

(1) Removal

(i) Remove the screw shown in the figure with a suitable coin (or screwdriver).

(ii) Move the VTR in the opposite direction to the arrows, and disassemble it.

(2) Installation

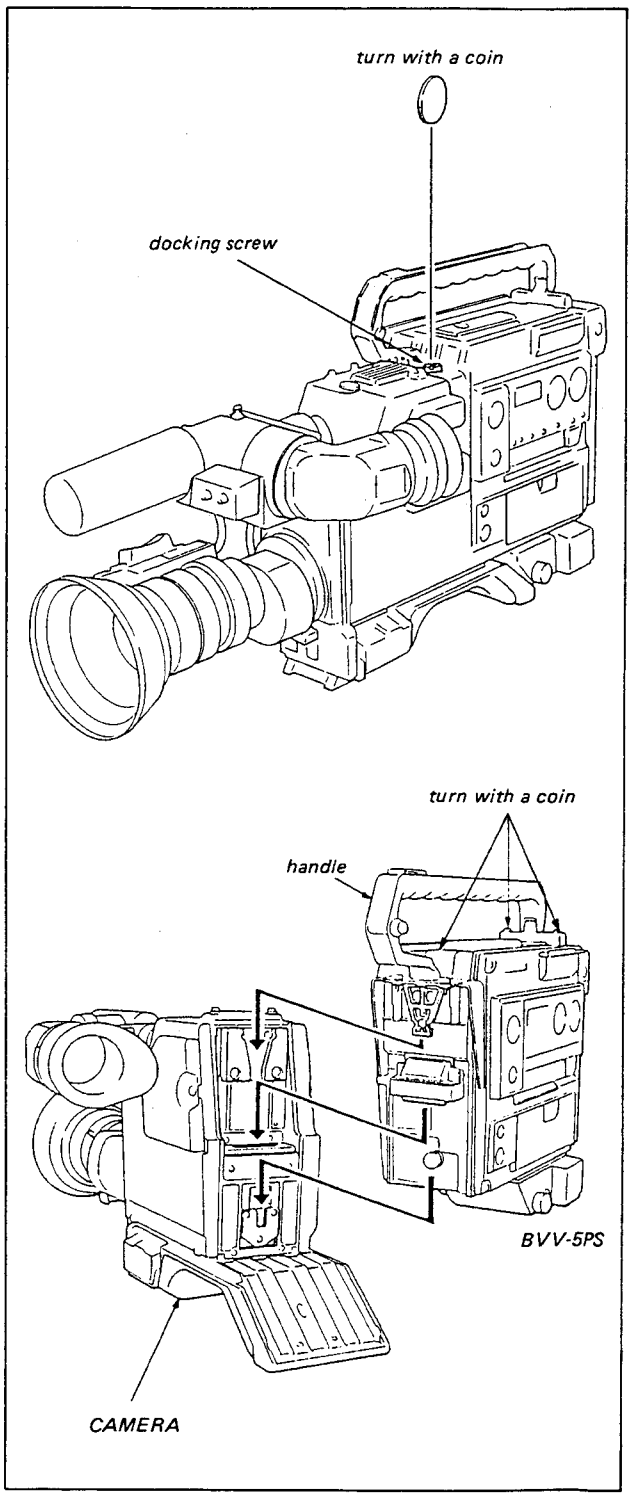
(i) Move the VTR in the direction of the arrows, and assemble them. If the 50P connector of the VTR will not mate correctly with the camera, slightly move the connector of the VTR by hand.

(ii) Tighten the screw.

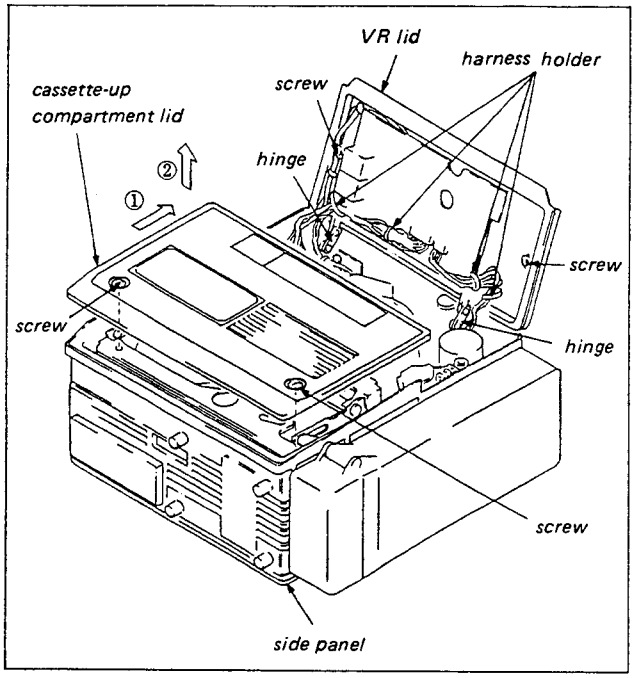
(3) Handle Position

(i) Install the camera and the VTR. Unscrew with a coin the fixing screw of the handle.

(ii) Install the handle as shown in the figure and tighten the fixing screws.



## 3-2. REMOVAL OF LIDS AND THE PANEL

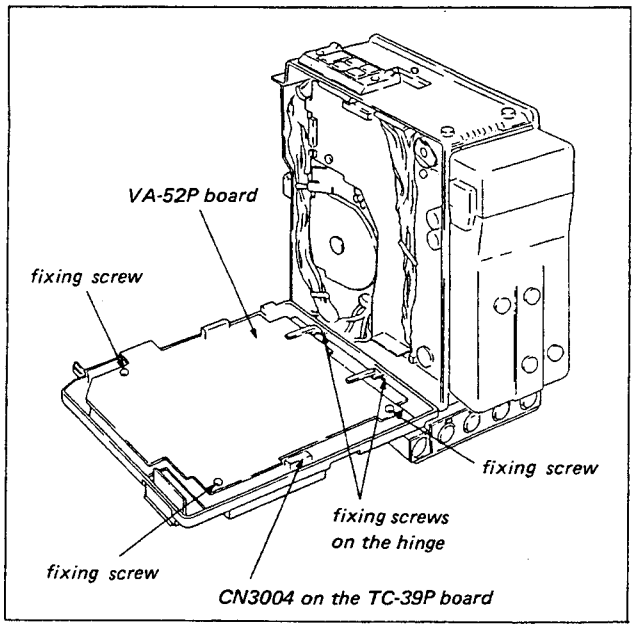



- **Side Panel**
- Loosen the four fixing screws and open the side panel. Never remove these screws from the side panel.
- When installing the side panel, be sure not to pinch a harness between the panel and the chassis.

- **VR Lid**
- Loosen the two fixing screws, and remove the VR lid. Never remove these screws from the VR lid.
- When installing, tighten the harness holders. Be sure not to damage on the brush on the drum and so on.

- **Cassette-up Compartment lid**
- Loosen the two fixing screws, and move cassette-up compartment lid in the direction of the arrows ① and ②. Remove the cassette-up compartment lid. Never remove these screws from the cassette-up compartment lid.
- When installing, move the lid to the opposite direction of the arrows ② and ① so that the projection of the cassette-up compartment is inserted into the hole of the lid.

## 3-3. HOW TO OPEN THE PRINTED CIRCUIT BOARDS

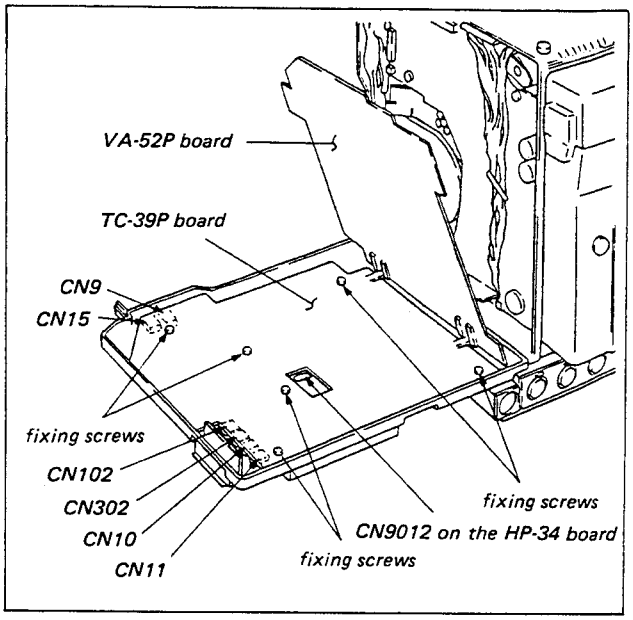



(1) VA-52P Board

- Open the side panel. (Refer to the section 3-2.)
- Remove the 2 fixing screws on the hinge.
- Remove the 3 fixing screws on the VA-52P board.
- Disconnect the CN3004 on the TC-39P board. The VA-52P board can be opened.

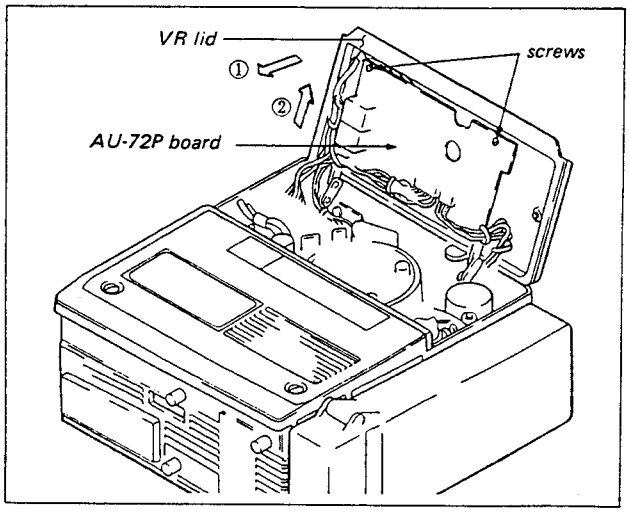
(2) TC-39P Board

- Open the VA-52P board. (Refer to step(1).)
- Remove the 6 fixing screws on the TC-39P board.
- Disconnect the CN9, 15, 102, 302, 10, and the 11 on the TC-39P board.
- Disconnect the CN9012 on the HP-34 board.
  The TC-39P board can be opened.



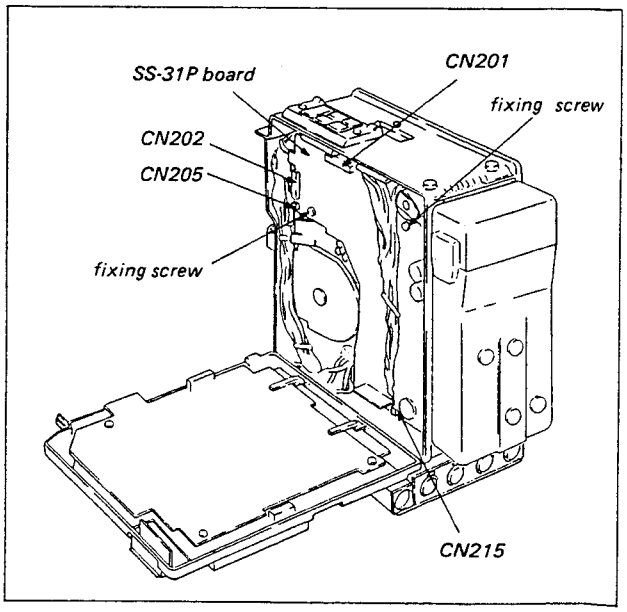

(3) AU-72P Board

- Open the VR lid. (Refer to the section 3-2.)
- Remove the 2 fixing screws on the AU-72P board.
- Pull up the AU-72P board in the direction of the arrows ① and ②.
  The AU-72P board can be opened.



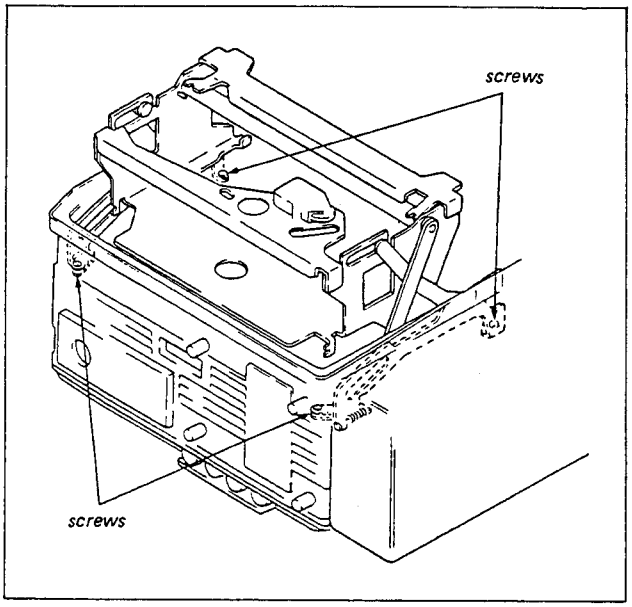

(4) SS-31P board

- Remove the 2 fixing screws.
- Disconnect the CN201, 202, 205 and 215.
  The SS-31P board can be opened.
- Be sure not to damage on the FL-38 board.



### 3-4. HOW TO REMOVE THE CASSETTE-UP COMPARTMENT

(1) Put the unit into the threading-end mode.
(2) Remove the cassette-up compartment lid.
(3) Push the EJECT button, and make the cassette-up compartment up.
(When the power supply is not available, refer to sec. 3-12.)
(4) Loosen the 4 screws by a phillips type screwdriver (2.6mm dia.) shown in the figure.
Remove the cassette-up compartment.



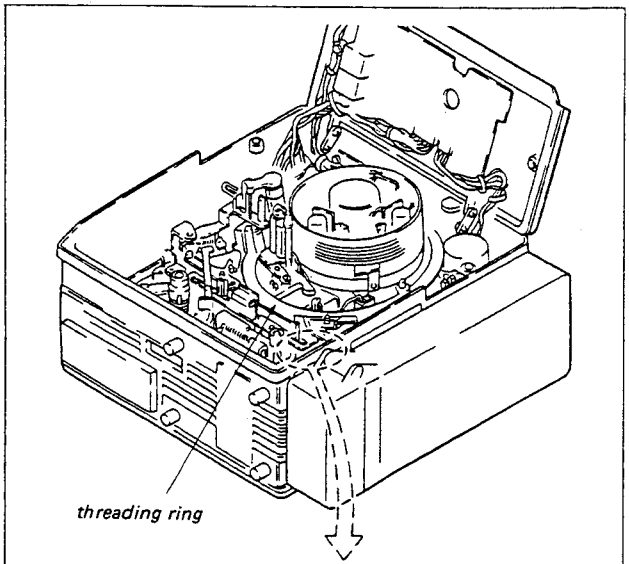

### 3-5. HOW TO PUT THE VTR INTO THE REC MODE WITHOUT CONNECTING A CAMERA

The BVV-5PS cannot record the video and audio signals without connecting a camera. Therefore, in order to put VTR into the REC mode without connecting the camera, it is necessary to use the "VA-1VP" or the "VA-5P". Refer to the instruction manuals furnished with them, for the details.

### 3-6. HOW TO PUT THE VTR INTO THREADING COMPLETION MODE WITHOUT CASSETTE TAPE

In this step, the following procedures are described in the state that the cassette-up compartment is mounted to the set. When the cassette-up compartment is removed from the set, the procedures are the same as described here.

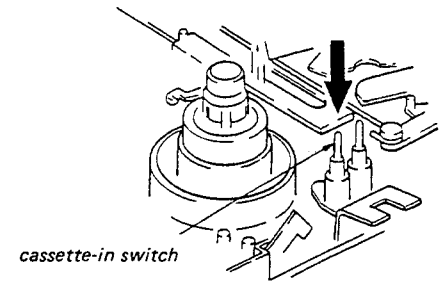
Power supply is available:
(1) Remove the cassette-up compartment lid. (Refer to the section 3-2.)
(2) Turn ON the POWER switch.




to next page

(3) Push the cassette-in switch, until the threading ring stops rotating.

Power supply is not available:
Refer to the section 3-13.




## 3-7. SPARE PARTS

(1) The shaded and ⚠ -marked components are critical to safety.
Replace only with the same components as specified.

(2) Replacement parts supplied from the Sony Parts Center will sometimes have a different shape and outside view from the parts which are used in the unit. This is due to "accommodating improved parts and/or engineering changes" or "standardization of genuine parts".
- This manual's exploded views and electrical spare parts lists indicate the part numbers of "the present standardized genuine parts".
- Regarding engineering part changes by our engineering department, refer to Sony service bulletins and service manual supplements.

(3) The parts marked with "s" in the SP column of the exploded views and electrical spare parts lists are normally stocked for replacement purposes. The parts marked with "o" in the SP column are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

## 3-8. CAUTION FOR ELECTRICAL PART REPLACEMENT

### 3-8-1. Micro Switch

The micro switch (1-571-064-11) is mounted on both CT-73 and SW-192 boards.
The micro switch doesn't work correctly if it is heated too much.
Therefore, be careful of the following, when they are replaced.

Use the 18W soldering iron.
Temperature of the soldering iron tip should be below 300°C.
It must be soldered within 3 seconds.

### 3-8-2. Chip Parts Replacement Procedure

BVV-5PS uses chip parts such as the carbon resistors, the ceramic capacitors, the transistors and the diodes in some circuits. It also uses flat-pack-type ICs.
The appearance of the carbon resistors and the ceramic capacitors are identical, and the appearance of the transistors and the diodes are identical.
Distinction between them can be sure by checking the reference printed on the boards.

Tools: Soldering iron (20W, 270 ±10°C)
Desoldering metal braid (Solder Taul or equivalent, Sony part number: 7-641-300-81)
Solder (0.6 mm dia.)
Tweezers

Soldering Conditions: Tip temperature; 270 ±10°C
Time; Within the 2 seconds

(1) Resistor and capacitor

(i) Heat the chip-part with the top of soldering iron tip and slide the chip-part aside when the solder is melted.

(ii) Confirm visually that there is no pattern peeling, damage, and/or bridge around the removed part.

(iii) Pre-solder the pattern where the part was removed.

(iV) Place a new chip-part onto the pattern and solder both sides.

**Do not use the removed chip-part again.**

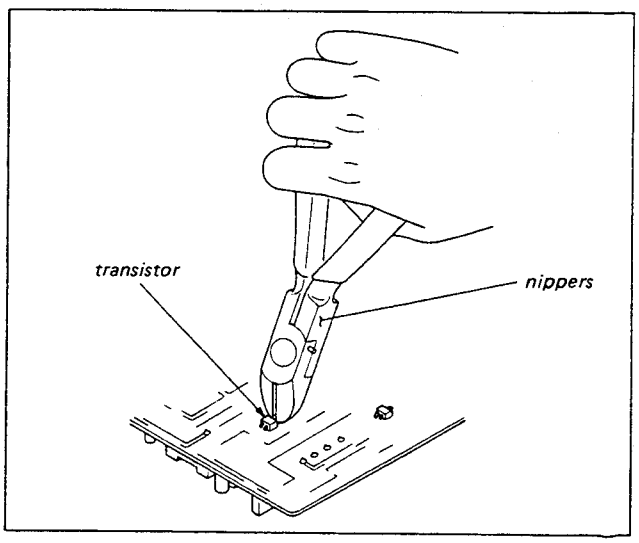
(2) Transistor and diode

(i) Cut the leads of the semiconductor part with nippers.

(ii) Remove the leads cut as the above, and confirm visually that there is no pattern peeling, any damage and/or bridge where the part was removed or its surrounding.

(iii) Pre-solder the pattern where the part was removed.

(iv) Place a new chip-part onto the pattern solder the leads.



## 3-9. FLEXIBLE PRINTED CIRCUIT BOARD

The flexible printed circuit board, FL-38 board, is placed between the machanical chassis and SS-31P board. The flexible printed curcuit board is used for the terminal board of the micro switches, photo-interrupter and so on. The flexible board is connected into the connectors on; CN-142, DR-48, SE-30, SS-31P, TC-39P, VA-52P boards. (See Fig. 2.) How to connect or disconnect the flexible board is shown in the Fig. 1. When soldering the terminals of the flexible board, be sure to use a less than 30W soldering iron.

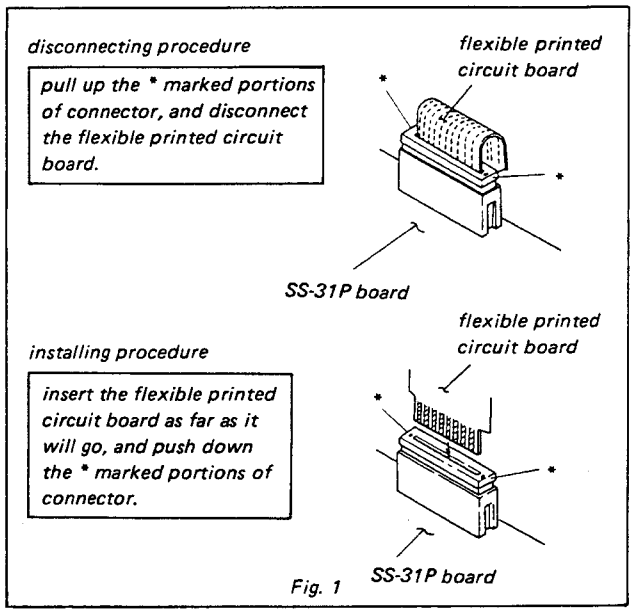

disconnecting procedure
pull up the * marked portions of connector, and disconnect the flexible printed circuit board.
flexible printed circuit board
SS-31P board
installing procedure
insert the flexible printed circuit board as far as it will go, and push down the * marked portions of connector.
flexible printed circuit board
SS-31P board

Fig. 1

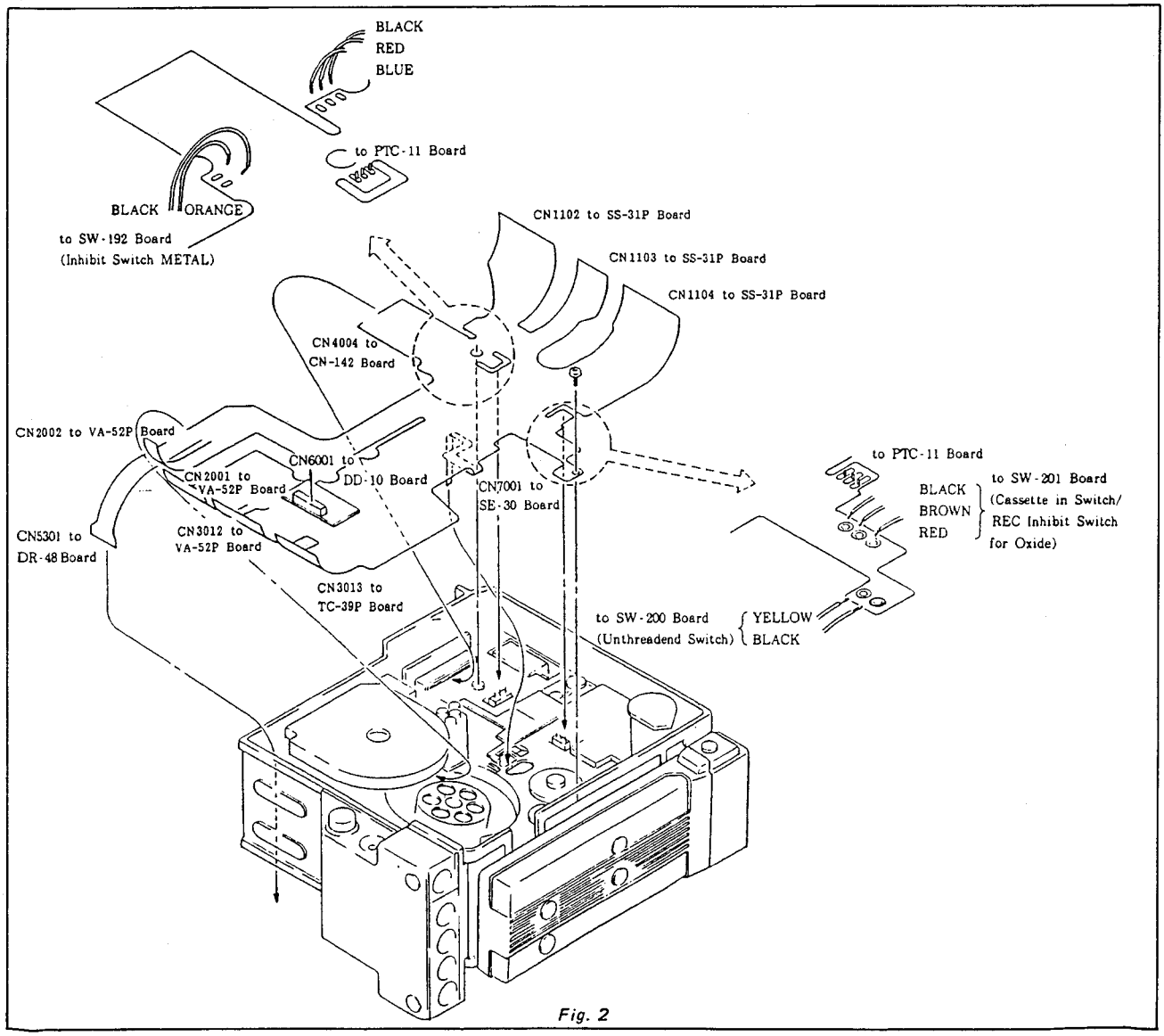
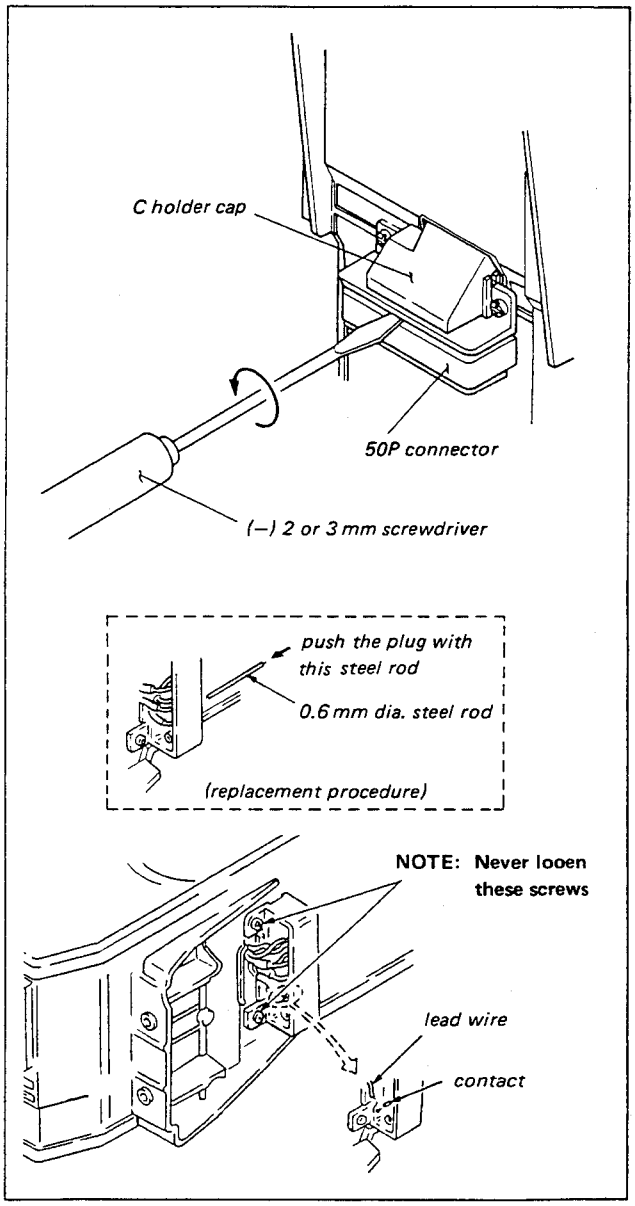



Fig. 2

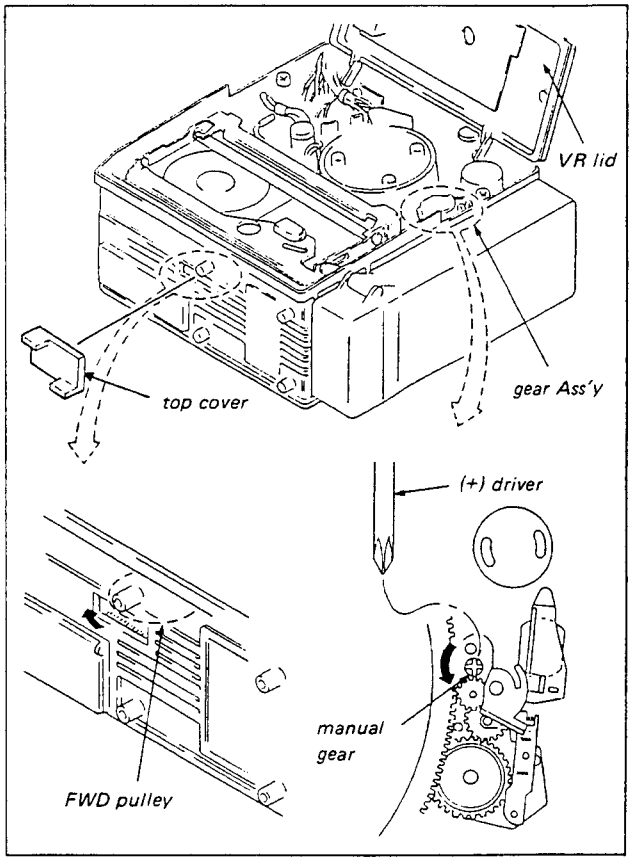
## 3-10. 50P CONNECTOR

The position of the 50P connector on the VTR is previously calibrated at the factory with a special tool. If this position is incorrect, the VTR connector cannot make positive contact with the camera or so. Therefore, do not remove the fixing screws of the V connector holder and 50P connector except in an emergency.

- When you check the 50P connector portion, remove the C holder cap as shown in the figure.
- If the lead wire is happened to be open at the 50P connector portion, solder the lead wire and the contact.
- If the connector indicates a poor contact with the plug, remove the contact as shown in the figure and replace it with a new one.



## 3-11. WHEN A TAPE SLACK IS ACTIVATED, HOW TO REMOVE THE CASSETTE TAPE



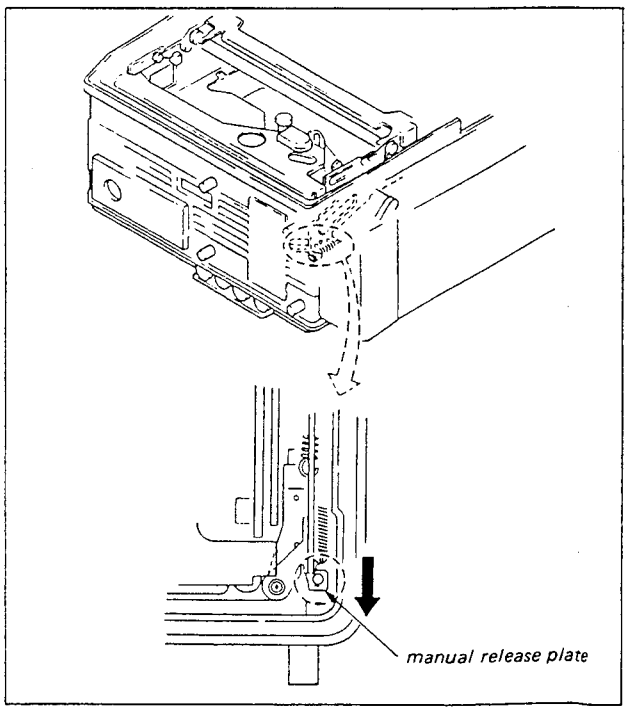

Power supply is available

(1) Press the EJECT button. After rotating in the unthreading direction for about 2 seconds, the threading ring stops rotating. Press the EJECT button again. Repeat the above, the unthreading mode is obtained and the tape is taken up on the take-up reel table. If uneven tension occurs and the tape can not be taken up, remove the top cover as shown in the figure. Rotate by hand the FWD pulley in the direction of the arrow and perform the above at the same time.

Power supply is not available

(2) Remove the cassette-up compartment lid, and open the VR lid. Rotate by hand the FWD pulley in the direction of the arrow. Rotate by a phillips type screwdriver counter-clockwise the mamual gear on the gear ass'y at the same time.

## 3-12. WHEN POWER IS NOT AVAILABLE, HOW TO MAKE THE CASSETTE-UP COMPARTMENT UP STATE




(1) Remove the cassette-up compartment lid.

(2) Pull the manual release plate in the direction of the arrow.
Cassette-up compartment up state is obtained.

## 3-13. MANUAL GEAR

In an emergency, if a power supply is not available, the manual gear is useful. By rotating the manual gear, the mechanical modes are obtained as shown in the figure (i) to (iv). (The position of the slider limits the mechanical mode.) Be sure not to rotate the gear further on where the ring stopper stops to the unthreading roller.

- **Unthreading-end mode**
  Unthreading-end mode is equal to the EJECT mode. The threading guides, the tension regulator arm and the threading ring are at the cassette tape side.
- **Threading-end mode**

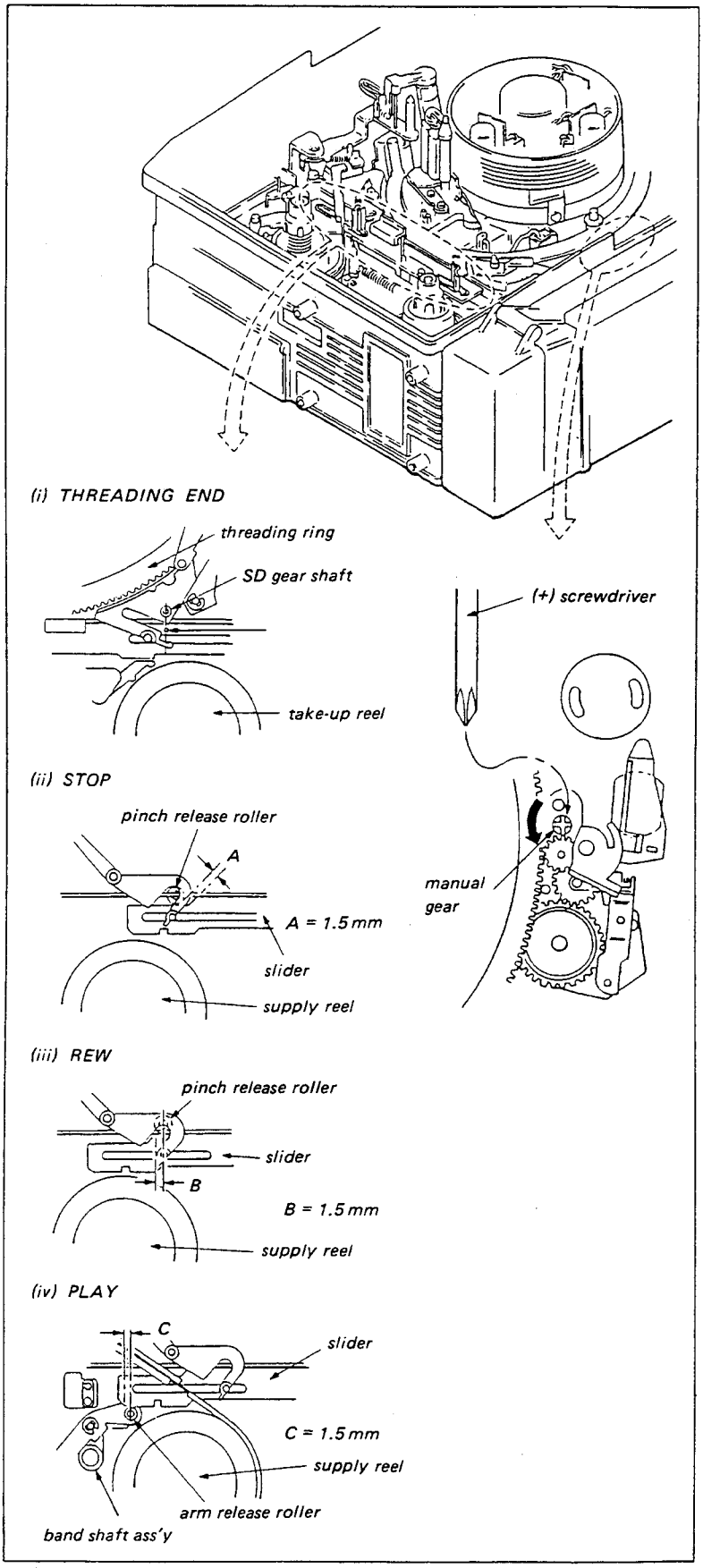
(1) Power ON the unit.
(2) Push the cassette-in switch untill the threading ring's rotation stops.

- **PLAY mode without a cassette tape**

(1) Power ON the unit.
(2) Push the cassette-in switch until the threading ring's rotation stops.
(3) Push the PLAY button.

- **PLAY mode**

(1) Power ON the unit.
(2) Insert a cassette tape into the unit.
(3) Push the PLAY button.



### 3-14. SELF-DIAGNOSTICS

In case of trouble, the cause and the mode of slack or no reaction are displayed as below while the stop key is depressed.

| TROUBLE CAUSE | LCD on the side panel | | | | | | Symptom |
|---|---|---|---|---|---|---|---|
| | RF | SERVO | HUMID | SLACK | TAPE END | BATT | |
| Drum rotate signal does not generate. | | | | | | ○ | Slack |
| Capstan rotate signal does not generate. | | | | ○ | | | Slack |
| Tension regulator SW does not turn OFF. | | | | ○ | | ○ | Slack |
| T-FG pulse do not generate. | | | ○ | | | | Slack |
| Does not put into THREAD END/UNTHREAD END within 10 sec. after command is generated. | | | ○ | ○ | | | Slack |
| Does not put into the designated mode within 2 sec. after command is generated. | | | | | ○ | | No reaction |

| TROUBLE MODE | LEDS on the key board | | |
|---|---|---|---|
| | FF | PLAY | REW |
| REC | | Blinks in 4Hz | |
| REC pause | | Blinks in 1Hz | |
| PLAY (review play) | | Lights up | |
| FF | Lights up | | |
| REW | | | Lights up |
| STOP | Lights up | Lights up | Lights up |
| THREAD/UNTHREAD | Lights up | | Lights up |

## 3-15. ALIGNMENT FIXTURE

| Part Number | Description | For Use |
|---|---|---|
| J-6001-820-A | Drum Eccentricity Gauge (3) | Upper drum eccentricity adjustment |
| J-6001-830-A | Drum Eccentricity Gauge (2) | Upper drum eccentricity adjustment |
| J-6001-840-A | Drum Eccentricity Gauge (1) | Upper drum eccentricity adjustment |
| J-6031-840-A | Multi Connector Cable | Component signal interface |
| J-6080-008-A | Cassette Reference Plate | Reel table adjustment |
| J-6080-011-A | Reel Table Tension Gauge | Torque adjustment |
| J-6080-013-A | Dihedral Adjustment Screw | Video head dihedral adjustment |
| J-6086-570-A | Flatness Plate | Audio/TC heads zenith adjustment |
| J-6087-000-A | Drum Eccentricity Gauge (5) | Upper drum eccentricity adjustment |
| J-6152-450-A | Wire Clearance Gauge | Clearance check |
| J-6190-800-A | Tension Regulator Slantness Check Tool | Tension regulator slantness adjustment |
| J-6321-040-A | Screwdriver for Motor Pulley | Motor pulley replacement |
| J-6331-120-A | Playback Amplifier | REC head alignment |
| Y-2031-001-0 | Cleaning fluid | Cleaning |
| 2-034-697-00 | Cleaning Piece | Cleaning |
| 7-732-050-10 | Tension Scale (20g full scale) | Torque and back tension adjustment |
| 7-732-050-20 | Tension Scale (50g full scale) | Torque and back tension adjustment |
| 7-732-050-30 | Tension Scale (100g full scale) | Torque and back tension adjustment |
| 7-732-050-40 | Tension Scale (200g full scale) | Torque and back tension adjustment |
| 7-732-050-50 | Tension Scale (500g full scale) | Torque and back tension adjustment |
| 7-732-902-00 | Inspection Mirror | Video tracking adjustment |
| 8-960-096-86 | Alignment tape CR8-1B PS | Audio Alignment |
| 8-960-096-51 | Alignment tape CR2-1B PS | Video tracking adjustment |
| 8-960-098-02 | Alignment tape CR2-1PS | Video tracking tape for recorder |
| 8-960-096-91 | Alignment tape CR5-1B PS | Video and servo alignments for recorder and player |
| 9-911-053-00 | Thickness Gauge | Clearance check |
| Standard Products | Head Demagnetizer (HE-4) | Head demagnetize |

# SECTION 4
# REPLACEMENT OF THE MAJOR PARTS AND COMPONENT

## 4-1. REPLACEMENT OF THE SUPPLY SIDE REEL TABLE

**Replacement procedure:**

(1) Remove the stop-ring on the top of the reel table with sharp-pointed tweezers as shown in the figure.

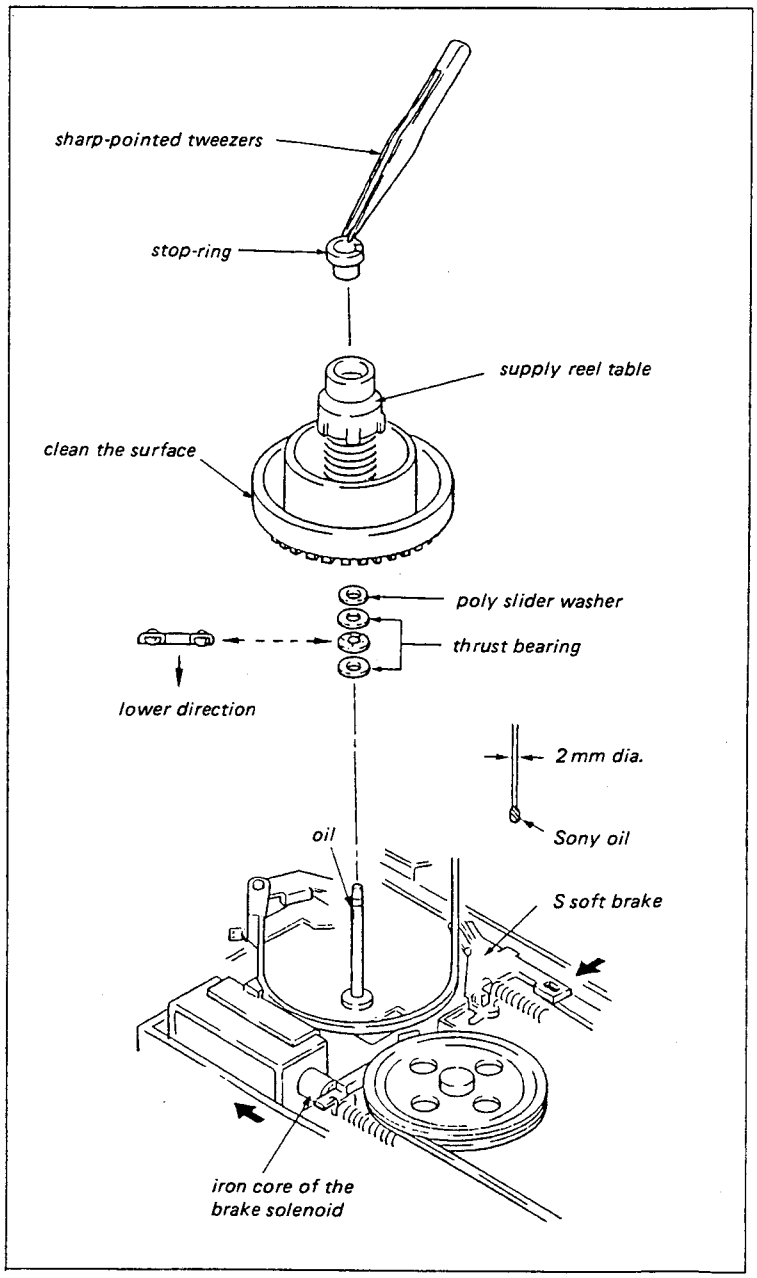
(2) Remove the reel table. Check the thrust bearing and polyslider washer on the reel shaft. When they are removed with reel table, install them on the reel shaft as shown in the figure.

(3) Clean the reel shaft and outside surface of the reel table with a cloth moistened with cleaning fluid.

(4) Apply a drop of sony oil on the reel shaft as shown in the fugure. One drop is about the amount on the tip of a 2mm diameter twig.

(5) Press the S soft brake, and press the iron core of the brake solenoid into the fully energized position. While pressing them, install the reel table on the reel shaft. Be sure not to damage the tension regulator band.

(6) Perform the sec. 5-1 Reel Table Height Adjustment. After the adjustment, install the stop-ring on the reel table.



## 4-2. REPLACEMENT OF THE TAKE-UP SIDE REEL TABLE

**Replacement procedure:**

(1) Remove the stop-ring on the top of the reel table with sharp-pointed tweezers as shown in the figure.

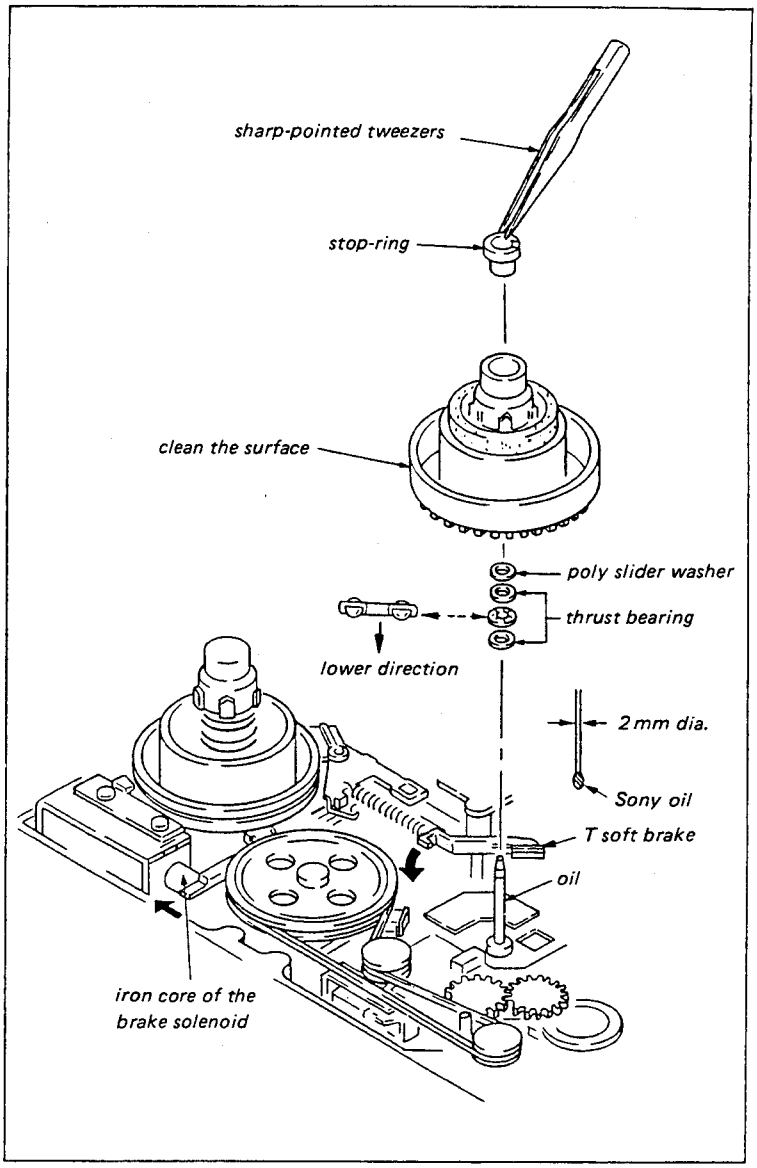
(2) Remove the reel table. Check the thrust bearing and polyslider washer on the reel shaft. When they are removed with reel table, install them on the reel shaft as shown in the figure.

(3) Clean the reel shaft and outside surface of the reel table with a cloth moistened with cleaning fluid.

(4) Apply a drop of sony oil on the reel shaft as shown in the figure. One drop is about the amount on the tip of a 2mm diameter twig.

(5) Press the T soft brake, and press the iron core of the brake solenoid into the fully energized position. While pressing them, install the reel table on the reel shaft.

(6) Perform the sec. 5-1 Reel Table Height Adjustment. After the adjustment, install the stop-ring on the reel table.



## 4-3. REPLACEMENT OF THE SUPPLY-SIDE REEL TABLE ROTATION DETECTOR (PTC-11 BOARD)

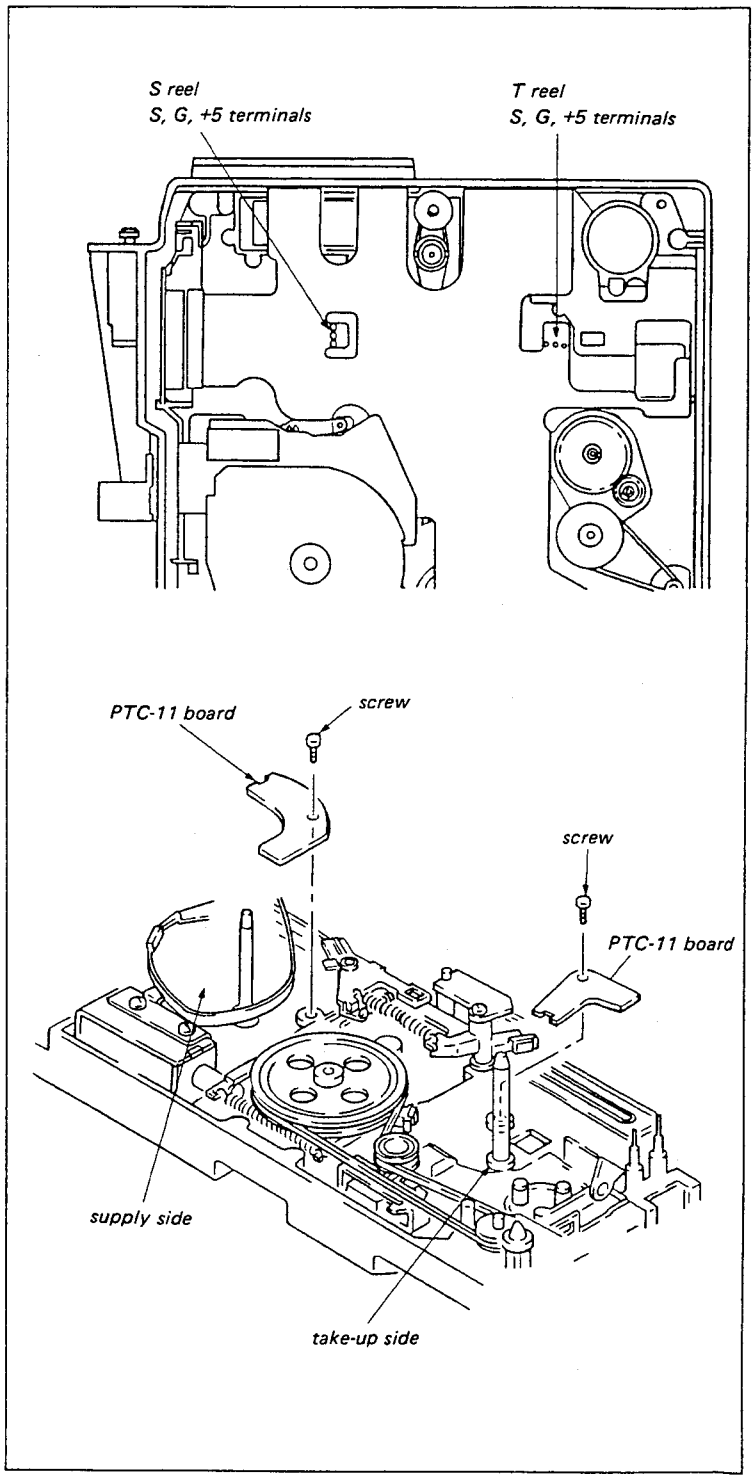
**Replacement procedure:**

(1) Open the side panel and remove the SS-31P board. Disconnect CN102, 103, 104, 201, 202, 204, 205, 211, 214.
(2) Unsolder the terminals (marked with S,G,+5) on the FL-38 board.
(3) Remove the S-reel table. (Refer to the section 4-1.)
(4) Unscrew and remove the S-reel table rotation detector (PTC-11 board).
(5) Replace the PH-1 (S-reel rotation detector) on the PTC-11 board. Install the PTC-11 board to the unit.
(6) Install the S-reel table.
(7) Solder CN1 on the PTC-11 board to the terminals (marked with S,G,+5) on the FL-38 board.
(8) Install the SS-31P board in the unit and close the side panel.

## 4-4. REPLACEMENT OF THE TAKE-UP SIDE REEL TABLE ROTATION DETECTOR (PTC-11 BOARD)

**Replacement procedure:**

(1) Open the side panel and remove the SS-31P board. Disconnect CN102, 103, 104, 201, 202, 204, 205, 211, 214.
(2) Unsolder the terminals (marked with S,G,+5) on the FL-38 board.
(3) Remove the T-reel table. (Refer to the section 4-2.)
(4) Unscrew and remove the T-reel table rotation detector (PTC-11 board).
(5) Replace the PH-1 (T-reel rotation detector) on the PTC-11 board. Install the PTC-11 board to the unit.
(6) Install the T-reel table.
(7) Solder CN1 on the PTC-11 board to the terminals (marked with S,G,+5) on the FL-38 board.
(8) Install the SS-31P board in the unit and close the side panel.



## 4-5. REPLACEMENT OF THE LOADING MOTOR

**Replacement procedure:**

(1) Remove the screws shown in the figure. Remove the tape top sensor ass'y.

(2) Open the side panel. Remove the fixing screws of the SS-31P board. Disconnect CN102, 103, 104, 201, 202, 203, 204, 205, 206, 207, 210, 211, 212, 213, 214, 215. Remove the SS-31P board.

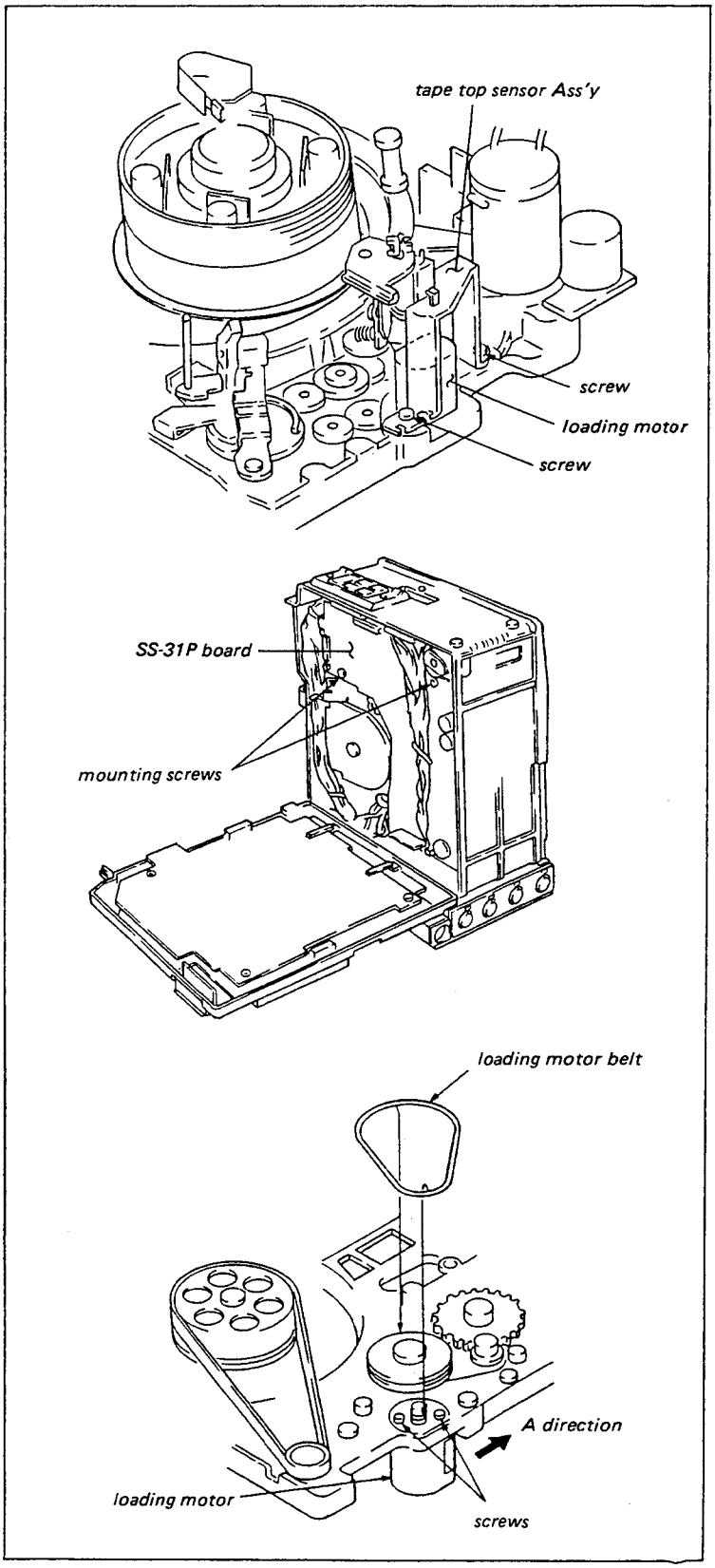
(3) Remove the loading motor belt as shown in the figure.

(4) Remove the two screws and the loading motor.

(5) Install the loading motor with the label faced in the direction of the arrow A.

(6) Clean the loading motor belt using the cleaning piece moistened with cleaning fluid. Install the belt. Be sure not to twist it.

(7) Install the tape top sensor.



## 4-6. REPLACEMENT OF THE DRUM MOTOR

**Tool:** Allen wrench (across flat 0.89mm dia.)

**Replacement procedure:**

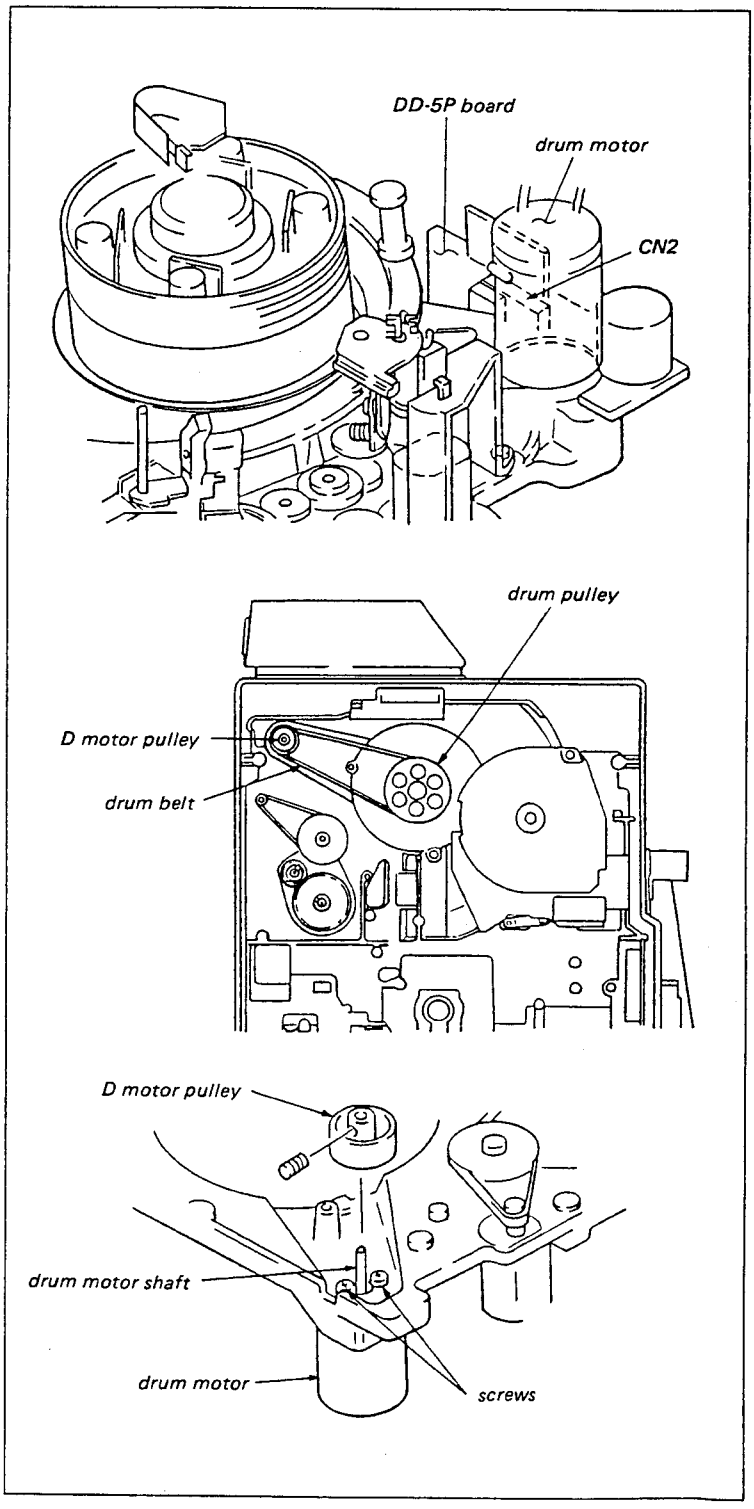
(1) Disconnect the CN2 on the DD-5P board.

(2) Open the side panel and remove the D motor pulley with an allen wrench (across flat 0.89mm dia). Support with a finger so as not to remove the drum belt from the drum pulley. (If the drum belt is removed from the drum pulley, it can only be replaced by without removing the FL-38 board.)

(3) Disconnect the two fixing screws shown in the figure, replace the drum motor.

(4) Re-assemble them by reversing steps (1) to (3).

(5) Put the cleaning piece moistened with cleaning fluid on the drum belt. Clean the drum belt by rotating by hand the D motor pulley.



## 4-7. REPLACEMENT OF THE CAPSTAN MOTOR

**Replacement procedure:**

(1) Open the SS-31P board.

(2) Remove the audio head ass'y. (Refer to the sec. 4-11.)

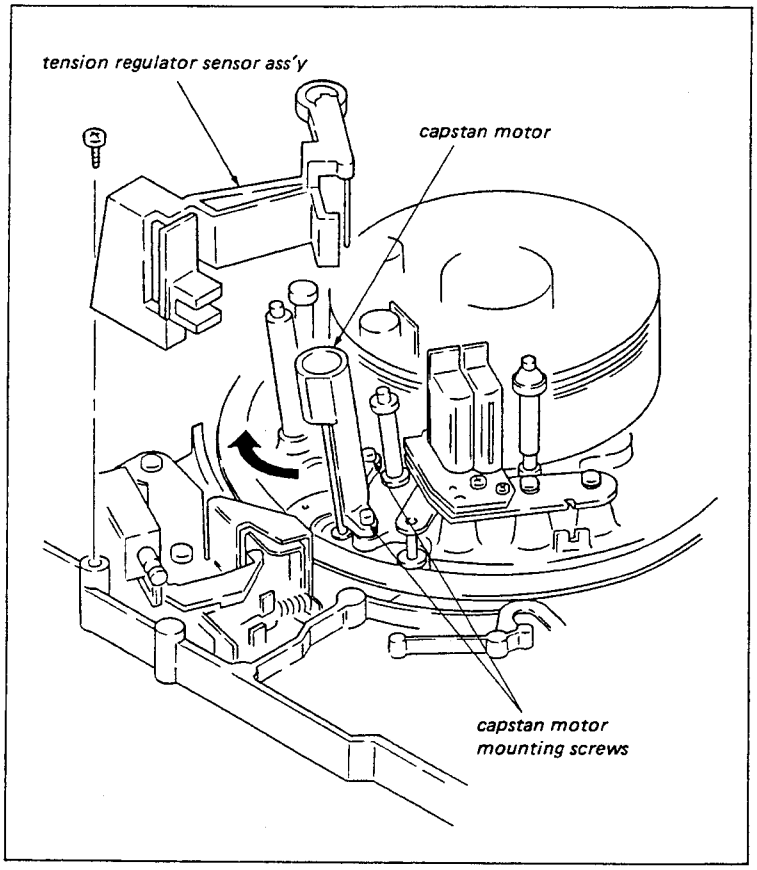
(3) Remove the tension regulator sensor ass'y.

(4) Remove the fixing screws of the capstan motor.

(5) Pull down the capstan motor in the direction shown in the figure.

(6) Replace the capstan motor. Be sure not to damage the capstan shaft by contact with the inside surface of the threading ring.

(7) Re-assemble them by reversing the step (1) to (5). Be sure not to damage the FL-38 board.



## 4-8. REPLACEMENT OF THE REEL MOTOR

**Tool:** Screwdriver for motor pulley, 1.27-millimeter L wrench

**Replacement procedure:**

(1) Open the side panel. Disconnect CN211 on the SS-31 board.

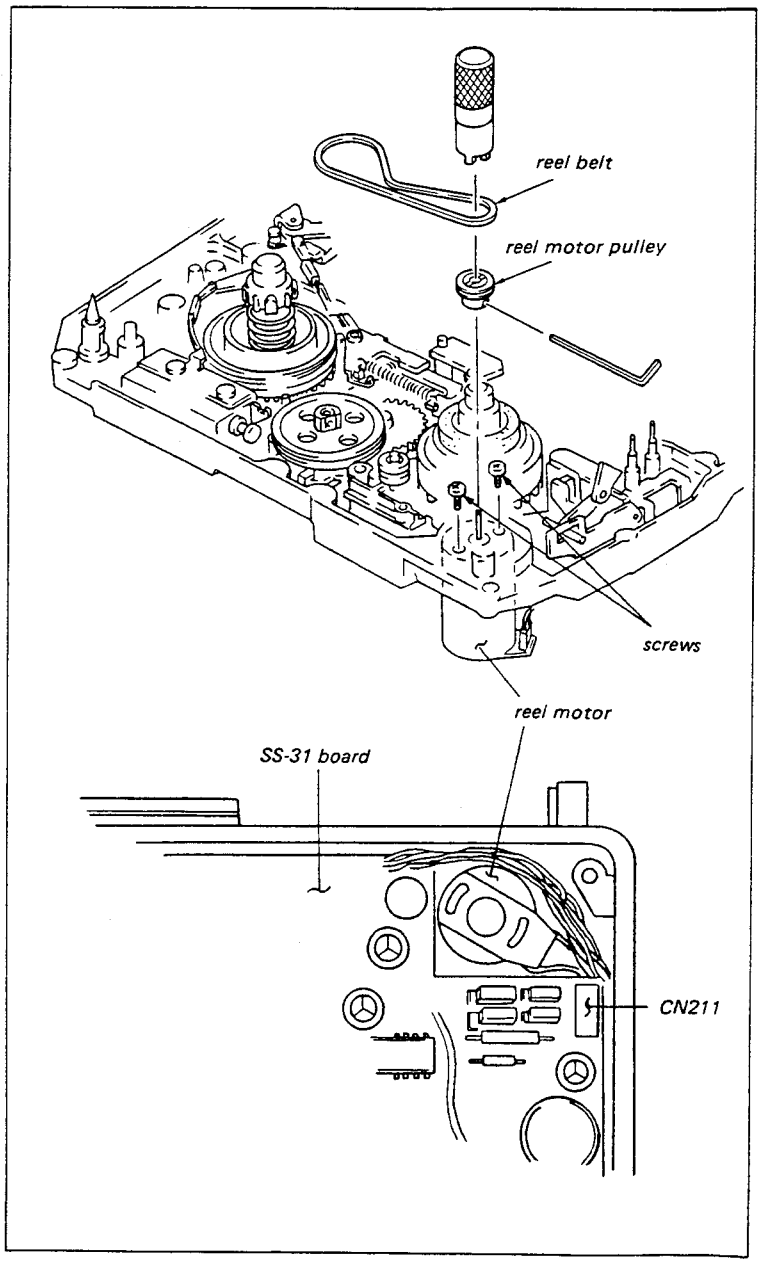
(2) Remove the reel belt.

(3) Remove the reel motor pulley with the screw-driver for the motor pulley. Insert the 1.27-millimeter L wrench into the hole of the reel motor pulley at this time so that it does not rotate.

(4) Remove the two fixing screws shown in the figure.

(5) Insert the reel motor pulley through the reel motor shaft as far as it will go. Tighten the reel motor pulley by the screw-driver for motor pulley. Insert the 1.27-millimeter L wrench into the hole of the reel motor pulley at this time so that it does not rotate.

(6) Clean the reel belt with the cleaning piece moistened with cleaning fluid. Re-assemble them by reversing the steps (1) and (2). Check that the reel belt is not twisted.



## 4-9. REPLACEMENT OF THE UPPER DRUM

The rotary video heads should not be replaced indidividually, the whole upper drum ass'y must be replaced when any of these heads fails.

Toll: Drum eccentricity gauge (1)
Drum eccentricity gauge (2)
Drum eccentricity gauge (3)
Drum eccentricity gauge (5)

**Replacement procedure:**

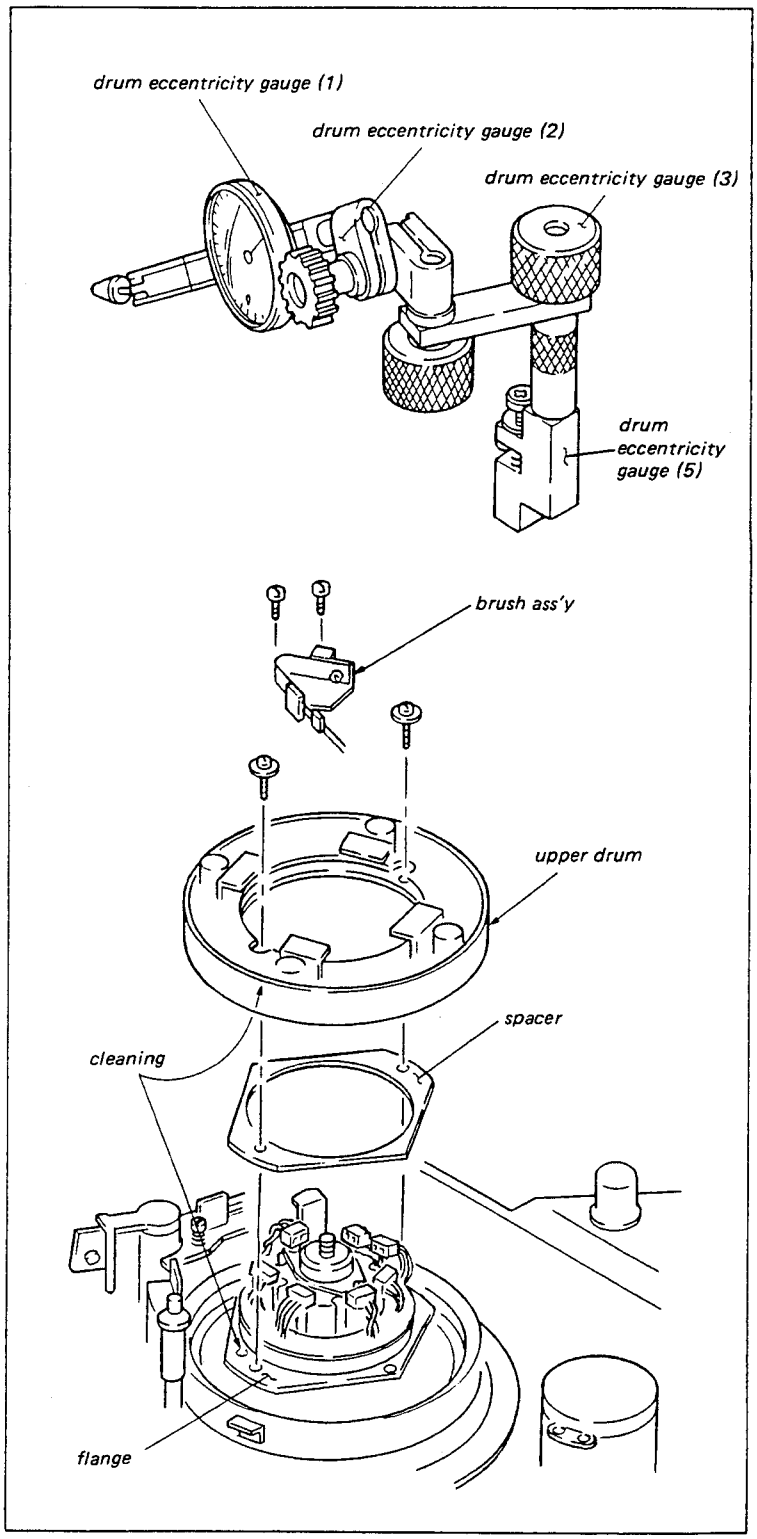
(1) Disconnect CN1, 2, 3, 4, 5, 6, 7 on the printed circuit board of the upper drum.

(2) Remove the screws shown in the figure. Remove the brush ass'y.

(3) Remove the two fixing screws of the upper drum, and remove the upper drum ass'y.

(4) Clean the matching surfaces of the flanges and new upper drum with a cleaning piece moistened with cleaning fluid. (If there are any spacers between the drum and the flange, they should not be removed. They are important to the drum height. If they are removed, be sure to install them again or replace if they have been damaged. Refer to the spare part section.)

(5) Place the upper drum to the flange and tighten the screws. Be sure not to damage to the head tips.



**Adjustment procedure:**

(1) Assemble the drum eccentricity gauge (1), (2), (3) and (5) as shown in the figure. Mount the assembled gauge on the unit so that the tip probe is in contact with the upper drum at a point about 5mm from the top edge.

(2) Turn the upper drum slowly clockwise and confirm the pointer deflection of the gauge is within 5 micron during one complete turn of the upper drum. If this specification is satisfied, proceed to step (5). If it is not, perform steps (3), (4), (5), (6), (7).

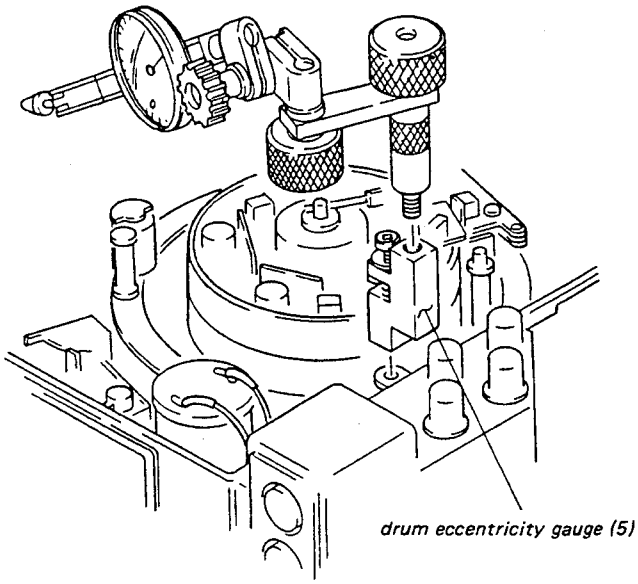
(3) Tap the inside of the upper drum with a nylon hammer or a screwdriver handle so that the gauge deflection remains within 5 micron.

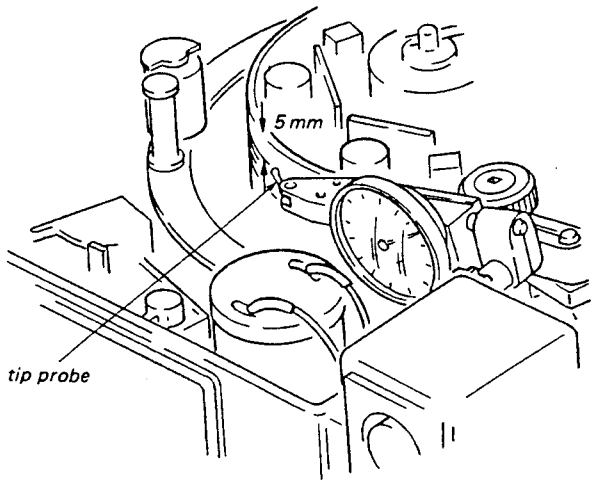
(4) After adjustment, tighten the two screws that are securing the upper drum, alternately and gradually using a tightening torque: 8kg.cm.

(5) After the screws are tightened, check again that the eccentricity of the upper durm is within 5 micron.

(6) Connect the CN1, 2, 3, 4, 5, 6, 7.

(7) Install the brush ass'y.

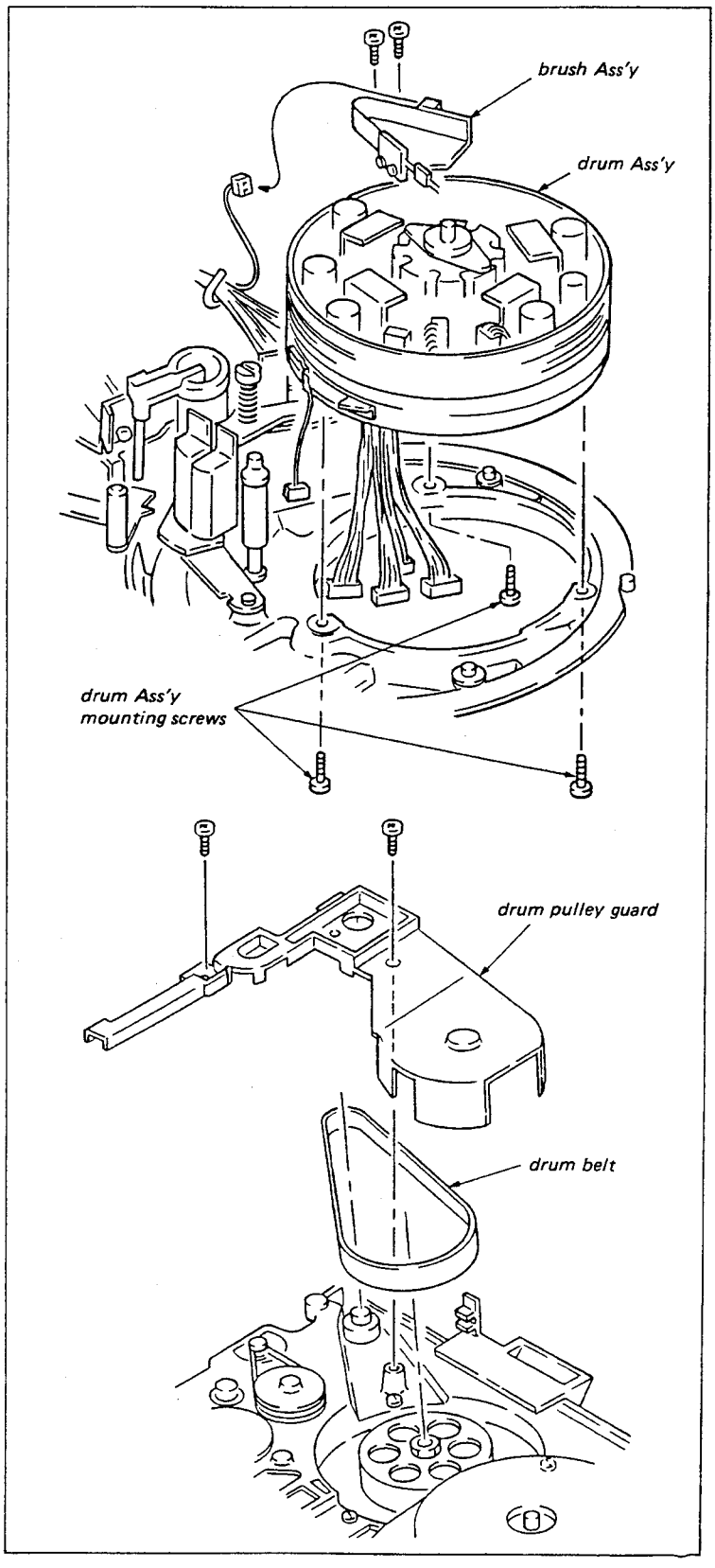


## 4-10. REPLACEMENT OF THE DRUM ASS'Y

**Replacement procedure:**

(1) Unscrew and remove the brush ass'y.
(2) Disconnect CN2 on the SE-30 board.
(3) Disconnect CN8, 9, 10, 11 on the VA-52P board, and CN209 on the SS-31P board.
(4) Remove the drum pulley guard.
(5) Remove the drum belt.
(6) Remove the 3 mounting screws of the drum ass'y, and replace the drum ass'y.
(7) Clean the drum belt with the cleaning piece moistened with cleaning fluid.
Re-assemble them by reversing the steps (1) to (5).

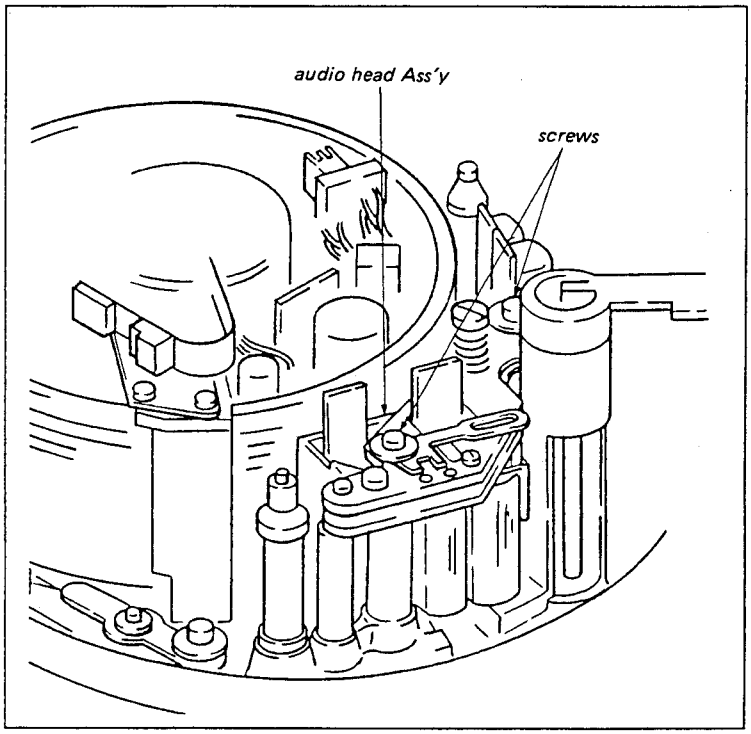


## 4-11. REPLACEMENT OF THE AUDIO HEAD

**Replacement procedure:**

(1) Disconnect CN1, 2, 3, 4, 5 on the PA-53 board.

(2) Remove the screws shown in the figure. Remove the audio head ass'y, and replace the new audio head.



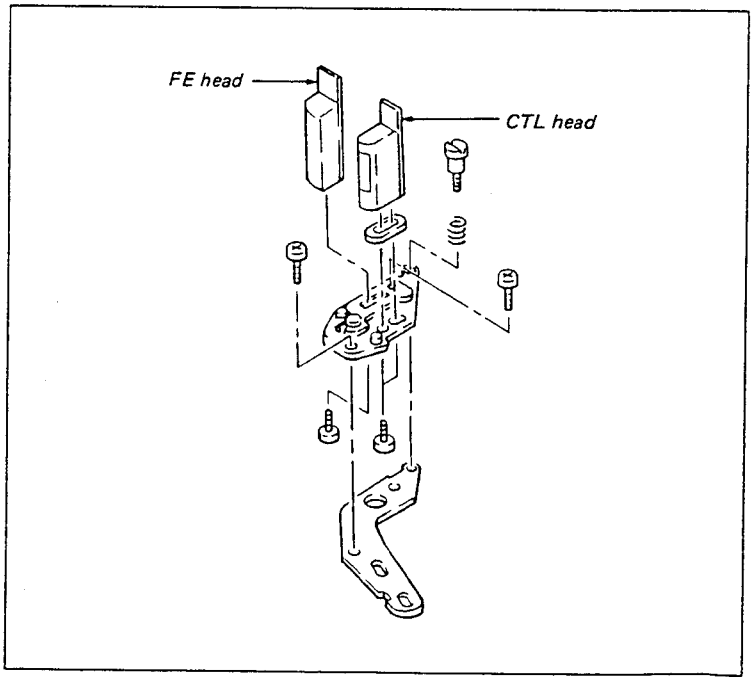

## 4-12. REPLACEMENT OF THE CTL/FE(FULL ERASE) HEAD

**Replacement procedure:**

(1) Unscrew the 2 mounting screws and remove the CTL/FE head ass'y.

(2) Remove the screws shown in the figure. Remove the CTL and/or the FE head.

(3) Clean the new CTL/FE head surface with the cleaning piece moistened with cleaning fluid. Re-assemble them by reversing the steps (1) and (2).



## 4-13. REPLACEMENT OF THE GEAR ASS'Y

**Tool:** Allen wrench (across flat has 0.89mm dia.)

**Replacement procedure:**

(1) Open the SS-31P board. (Refer to the sec. 3-3.)

(2) Remove the loading motor belt.

(3) Remove the deceleration pulley with an allen wrench (across flat has 0.89mm dia.).

(4) Unscrew the screw shown in the figure. Remove the cassette guide shaft R.

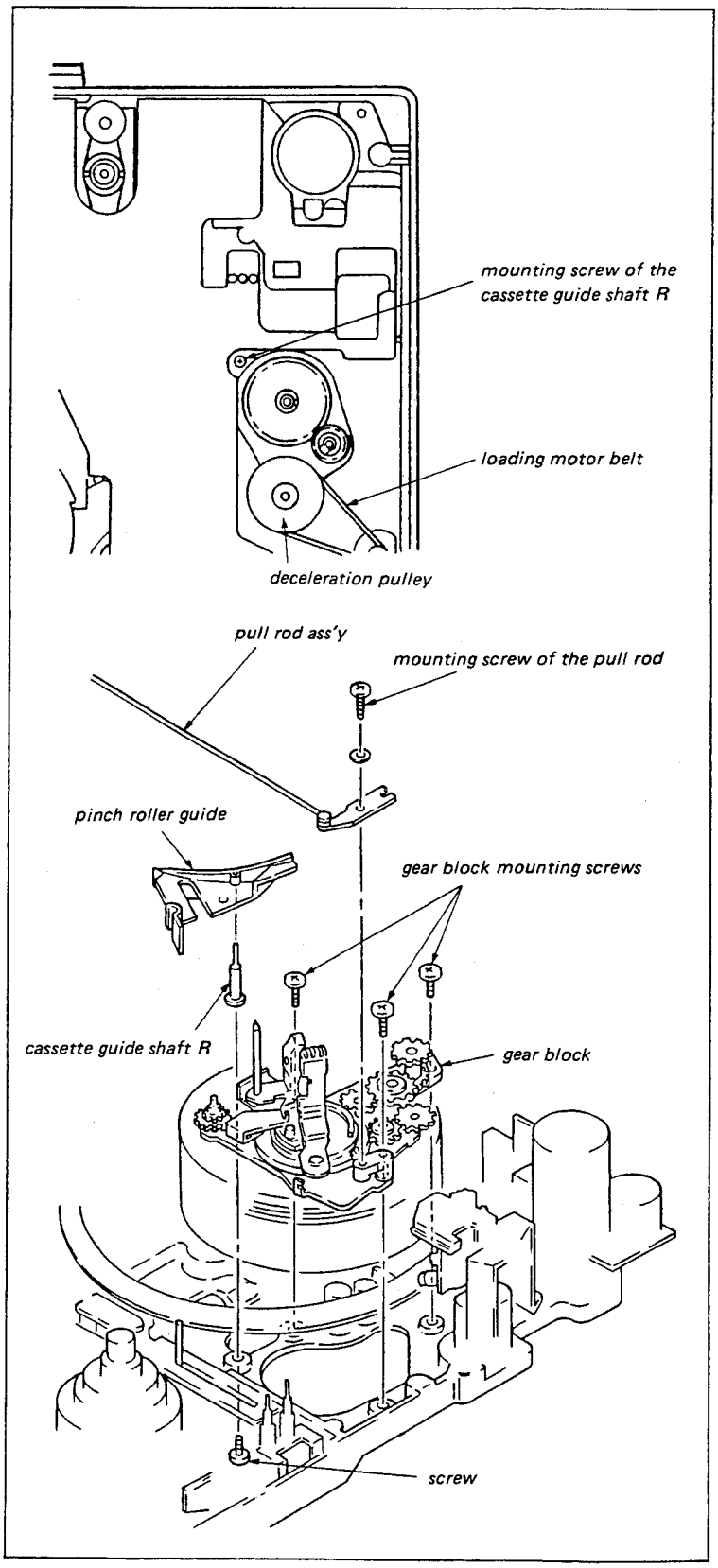
(5) Remove the pinch roller guide by hand.

(6) Unscrew and remove the pull rod ass'y as shown in the figure.

(7) Unscrew the 3 mounting screws and remove the gear block.

(8) Clean the threading motor belt with a cleaning piece moistened with cleaning fluid.

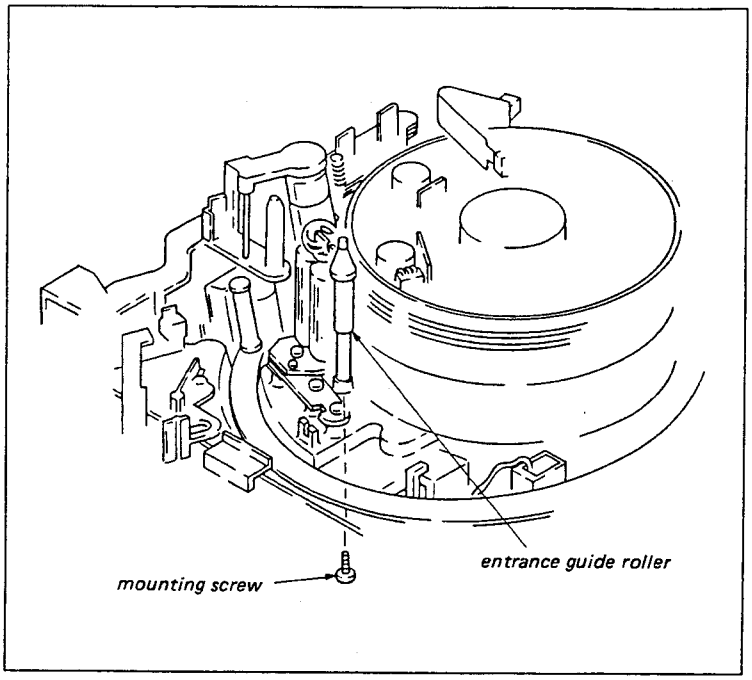
(9) Re-assemble them by reversing steps (1) to (7).



## 4-14. REPLACEMENT OF THE ENTRANCE GUIDE ROLLER

**Replacement procedure:**

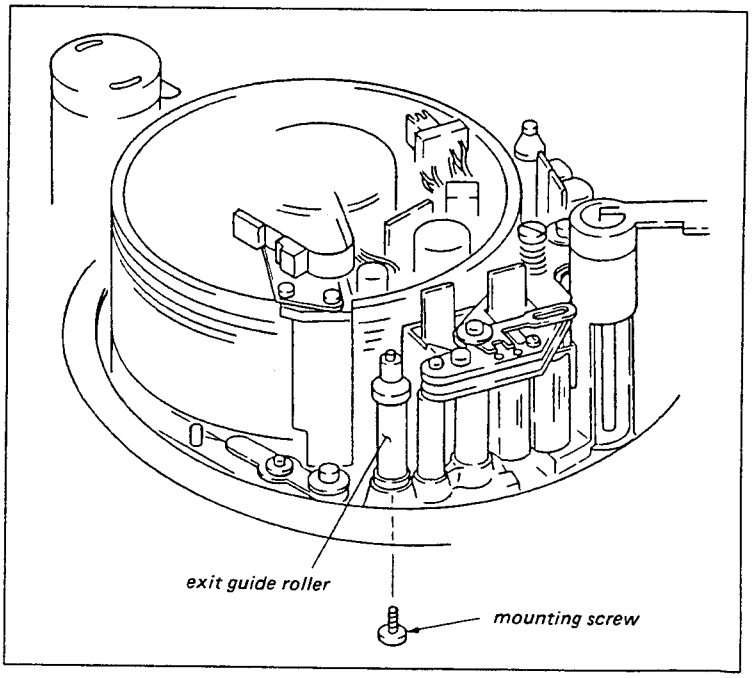
(1) Open the SS-31P board. (Refer to the sec. 3-3.)
(2) Remove the capstan motor. (Refer to the sec. 4-7.)
(3) Remove the mounting screw on the entrance guide roller.
(4) Remove the entrance guide roller.
(5) Replace the entrance guide with a new one. Re-assemble them by reversing steps (1) to (3).




## 4-15. REPLACEMENT OF THE EXIT GUIDE ROLLER

**Replacement procedure:**

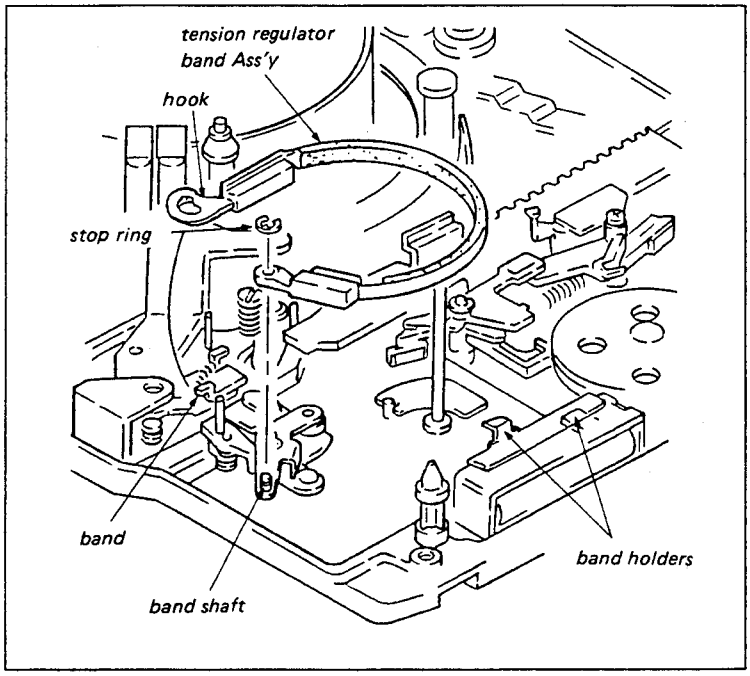
(1) Open the SS-31P board. (Refer to the sec. 3-3.)
(2) Unscrew the mounting screw shown in the figure.
(3) Remove the exit guide roller.
(4) Re-assemble them by reversing steps (1) to (3).



## 4-16. REPLACEMENT OF THE TENSION REGULATOR BAND

**Replacement procedure:**

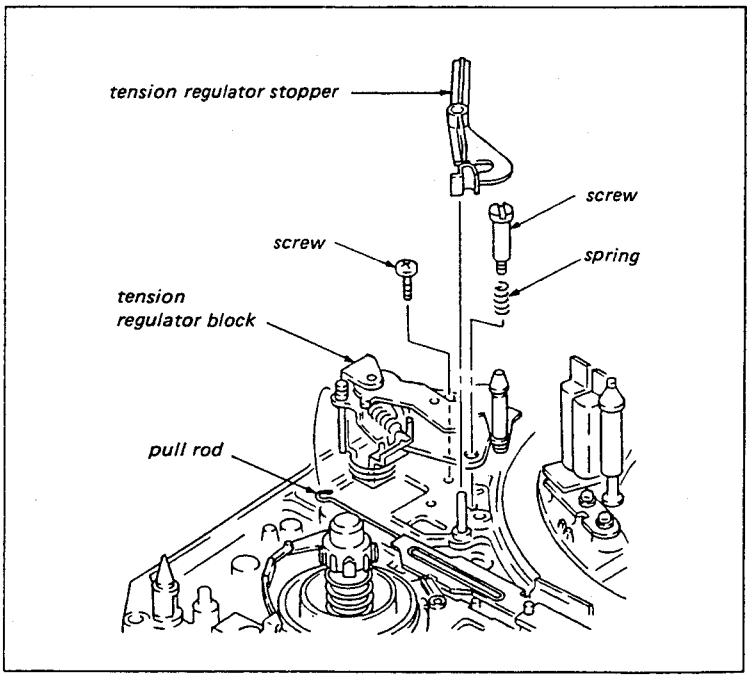
(1) Remove the S-reel table. (Refer to the sec. 4-1.)
(2) Take off the hook portion of the tension regulator band.
(3) Remove the stop ring shown in the figure from the band shaft.
(4) Remove the tension regulator band ass'y from the band shaft.
(5) Put the new tension regulator band ass'y into the unit, by reversing steps (2) to (4). Be sure not to damage the tension regulator band ass'y by band holder and so on.
(6) Re-assemble the S-reel table. (Refer to the sec. 4-1.)




## 4-17. REPLACEMENT OF THE TENSION REGULATOR BLOCK

**Replacement procedure:**

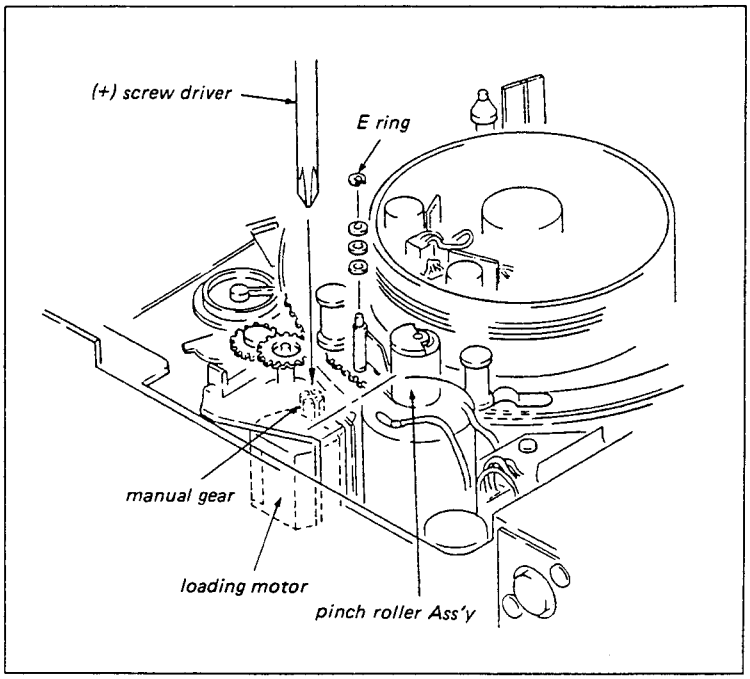
(1) Take off the hook of the tension regulator band. (Refer to the sec. 4-16.)
(2) Remove the pull rod.
(3) Remove the tension regulator stopper.
(4) Remove the two screws shown in the figure. Be sure not to drop the spring in the unit.
(5) Remove the tension regulator block out of the unit.
(6) Re-assemble them by reversing steps (1) to (5).



## 4-18. REPLACEMENT OF THE PINCH ROLLER

**Replacement procedure:**

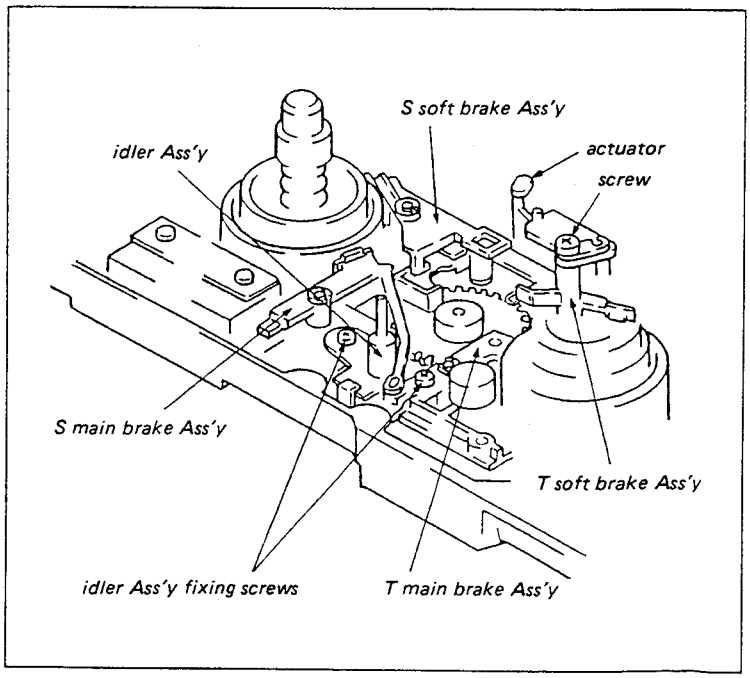
(1) Rotate the threading ring by the manual gear. Stop rotating the threading ring when the pinch roller reaches the loading motor.
(2) Remove the stop ring shown in the figure.
(3) Replace the pinch roller ass'y.
(4) Re-assemble them by reversing steps (1) and (2).




## 4-19. REPLACEMENT OF THE IDLER ASS'Y

**Replacement procedure:**

(1) Remove the idler pulley. (Refer to the sec. 4-20.)
(2) Remove the S main brake ass'y, and the T main brake ass'y.
(3) Unscrew the screw shown in the figure and remove the actuator. Be sure not to drop the screw.
(4) Remove the S soft brake ass'y, and the T soft brake ass'y.
(5) Unscrew the two fixing screws, and remove the idler ass'y.
(6) After replacement, re-assemble them by reversing steps (1) to (5).



## 4-20. REPLACEMENT OF THE IDLER PULLEY

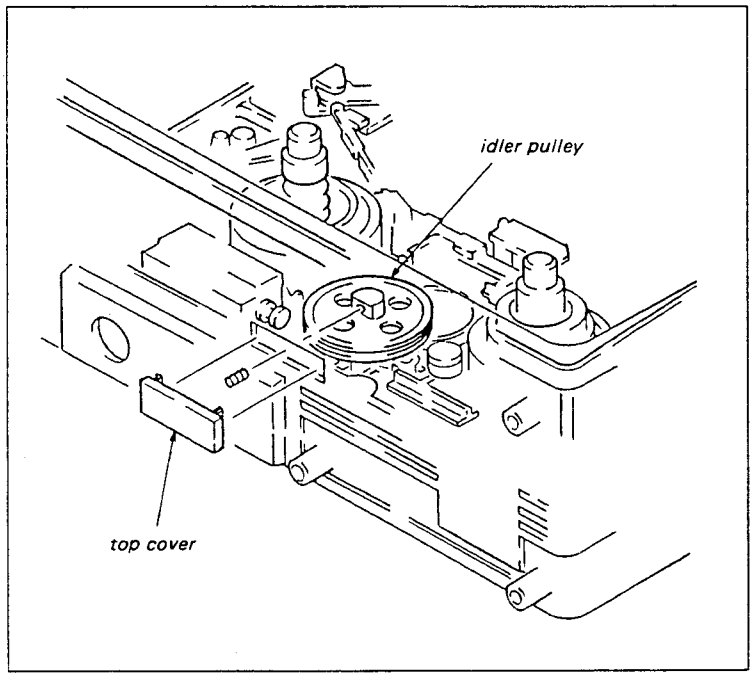
**Tool:** Allen wrench (across flat has 0.89mm)

**Replacement procedure:**

(1) Remove the reel belt. (Refer to the sec. 4-8.)

(2) Take off the top cover. Insert an allen wrench from the square-shaped hole. Loosen the screw and remove the idler pulley.

(3) Clean the reel belt with a cleaning piece moistened with cleaning fluid. Re-assemble them by reversing steps (1) and (2).




## 4-21. REPLACEMENT OF THE MICRO SWITCH ON THE SW-200 BOARD

**Replacement procedure:**

(1) Open the SS-31P board. (Refer to the sec. 3-3.)

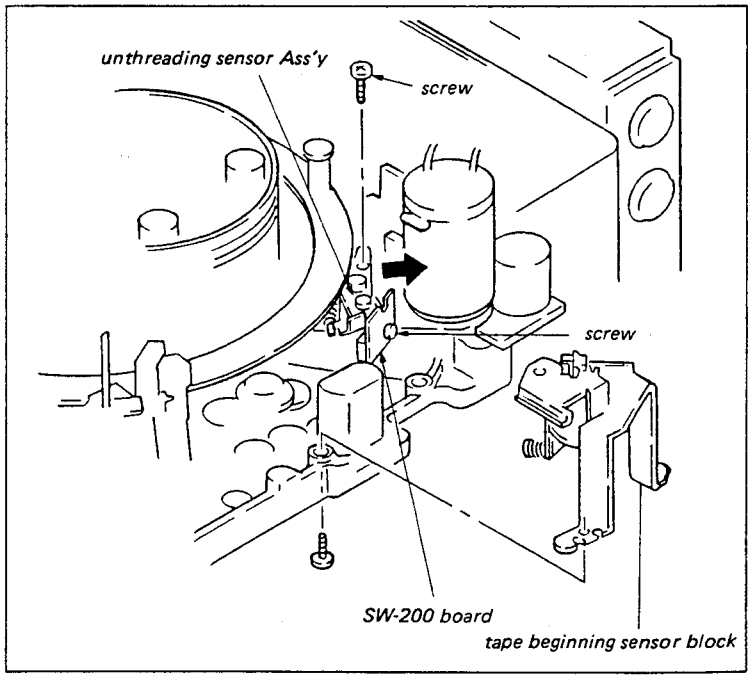
(2) Unscrew the two fixing screws and remove the tape beginning sensor block.

(3) Remove the screw shown in the figure. Pull out the unthreading sensor ass'y in the direction of the arrow.

(4) Unsolder the black and yellow colored leads on the SW-200 board.

(5) Unscrew the screw shown in the figure, and unsolder the micro switch on the SW-200 board.

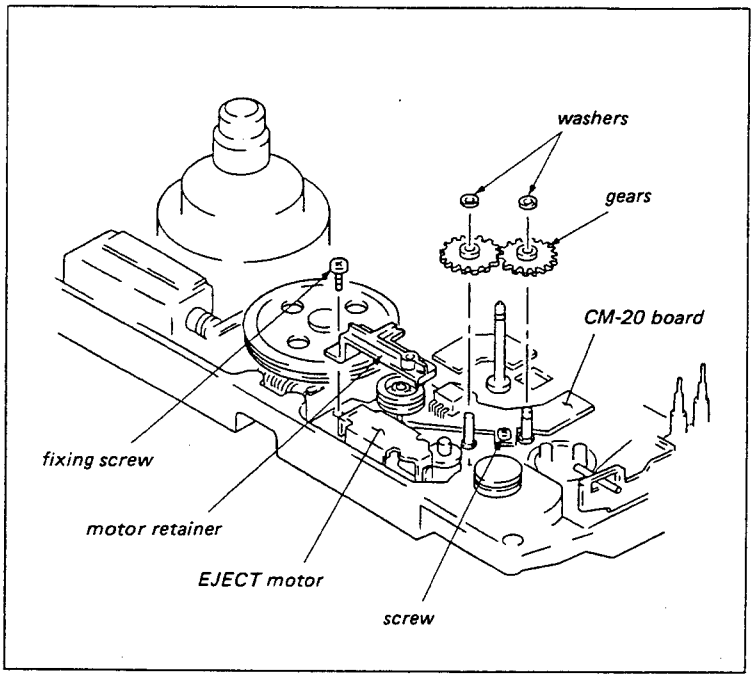
(6) After replacement, re-assemble them by reversing steps (1) to (5).



## 4-22. REPLACEMENT OF THE EJECT MOTOR

**Replacement procedure:**

(1) Remove the T-reel table. (Refer to the sec. 4-2.)
(2) Remove the T main brake. (Refer to the sec. 4-19.)
(3) Remove the washers and the intermediate gears.
(4) Unscrew the fixing screw and remove the motor retainer.
(5) Remove the screw shown in the figure. Lift up the CM-20 board.
(6) Unsolder and replace the EJECT motor.
(7) After replacement, re-assemble them by reversing steps (1) to (6).



## 4-23. ADJUSTMENT ITEM TABLE AFTER THE MAIN PARTS REPLACEMENT

Replacement of the Supply Reel Table

Reel Table Height Adjustment (sec. 5-1) → S Soft Brake Torque Adjustment (Sec. 6-1) → S Soft Reinforcement Brake Torque Adjustment (Sec. 6-3) → S Main Brake Torque Adjustment (6-4) → FWD Back Tension Adjustment (7-4) → Video Tracking Adjustment (7-2)

Replacement of the Take-up Reel Table

Reel Table Height Adjustment (sec. 5-1) → T Soft Brake Torque Adjustment (sec. 6-2) → T Main Brake Torque Adjustment (sec. 6-5) → FWD Torque Adjustment (sec. 6-7) → Tape Run Adjustment (T Drawer Guide Slantness Adjustment) (sec. 7-1-4)

Replacement of the Threading Motor

Tape Run Adjustment (T Drawer Guide Slantness Adjustment) (sec. 7-1-4) → Servo System Alignment (sec. 9)

Replacement of the Upper Drum

Upper Drum Eccentricity Adjustment (sec. 4-9) → Video Tracking Adjustment (sec. 7-2) → Video Head Dihedral Adjustment (7-8) → CTL Head Position Adjustment (sec. 7-4-3) → TC Head Position Adjustment (sec. 7-5-4) → Switching Position Adjustment (sec. 7-6) → Picture Splitting Compensator Adjustment (sec. 9-8) → Video System Alignment (sec. 11)

Replacement of the Drum Ass'y

Tape Run Adjustment (sec. 7-1) → Video Tracking Adjustment (sec. 7-2) → Video Head Dihedral Adjustment (7-8) → CTL Head Position Adjustment (sec. 7-4-3) → TC Head Position Adjustment (sec. 7-5-4) → Switching Position Adjustment (sec. 7-6) → Servo System Adjustment (sec. 9) → Video System Alignment (sec. 11)

Replacement of the Drum Motor

Servo System Alignment (sec. 9)

Replacement of the Capstan Motor

Threading-end Position Adjustment (sec. 5-6) → Pinch Press Ass'y Position Adjustment (sec. 5-7) → Tape Run Adjustment Around the Pinch Roller (sec. 7-1-2) → Video Tracking Adjustment (sec. 7-2) → Servo System Alignment (sec. 9)

Replacement of the Audio/TC Heads

Audio Head Zenith Adjustment (sec. 7-5-1) → Audio Head Height Adjustment (sec. 7-5-2) → Audio Head Phase Adjustment (sec. 7-5-3) → Video Tracking Adjustment (sec. 7-2) → TC Head Position Adjustment (sec. 7-5-4) → Audio System Alignment (sec. 10)

CTL Head Adjustment

CTL Head Azimuth Adjustment (sec. 7-4-1)→CTL Head Height Adjustment (sec. 7-4-2)→ Video Tracking Adjustment (sec. 7-2)→ CTL Head Position Adjustment (sec. 7-4-3)→ TC Head Position Adjustment (sec. 7-5-4)→ Audio System Alignment (sec. 10)

Replacement of the Gear Ass'y

Gear Ass'y Position Adjustment (sec. 5-5)

Replacement of the Entrance Roller Guide Ass'y/Exit Roller Guide Ass'y

Video Tracking Adjustment (sec. 7-2)

Replacement of the Tension Regulator Band

Tension Regulator Operating Position Adjustment (sec. 5-8-2)→ FWD Back Tension Adjustment (sec. 6-6)

Replacement of the Tension Regulator Block

Tension Regulator System Adjustment (sec. 5-8)→ FWD Back Tension Adjustment (sec. 6-6)→ Tape Run Adjustment (sec. 7-1)→ Video Tracking Adjustment (sec. 7-2)

Replacement of the Pinch Roller

Threading-end Position Adjustment (sec. 5-6)→ Pinch Press Ass'y Position Adjustment (sec. 5-7)→ Tape Run Adjustment Around the Pinch Roller (sec. 7-1-2)→Video Tracking Adjustment (sec. 7-2)

# SECTION 5
# LINK AND DRIVE SYSTEM ALIGNMENT

## ALIGNMENT INFORMATION

### MODE

. **Unthreading-end mode**

Unthreading-end mode is equal to the EJECT mode. The threading guides, the tension regulator arm and the threading ring are at the cassette tape side.

. **Threading-end mode**

(1) Power on the unit.

(2) Push the cassette-in shaft until the threading ring's rotation stops.

. **PLAY mode without a cassette tape**

(1) Power on the unit.

(2) Push the cassette-in shaft until the threading ring's rotation stops.

(3) Push the PLAY button.

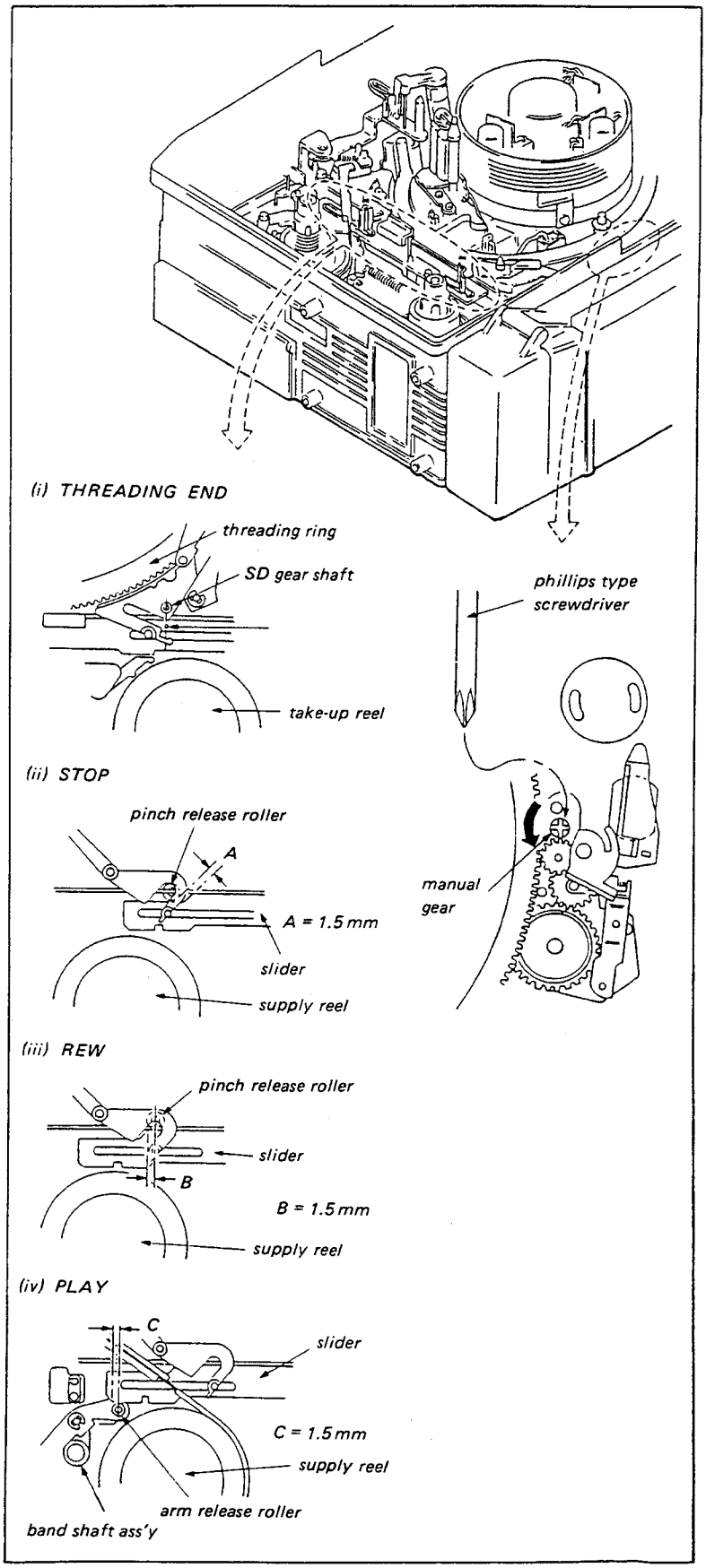
. **PLAY mode**

(1) Power on the unit.

(2) Insert a cassette tape to the unit.

(3) Push the PLAY button.

. Even if a power supply is not available, modes (i) to (iv) can be obtained mechanically, by rotating the manual gear. The modes are limited by the slider's position, as shown in the figure. Be sure not to rotate the manual gear further on where the unthreading roller stops to the stopper.



## HOW TO MAKE THE CASSETTE TAPE WITHOUT LID

Since the VTR is designed compact size, the check and adjustment can not be performed if cassette tape lid is installed.

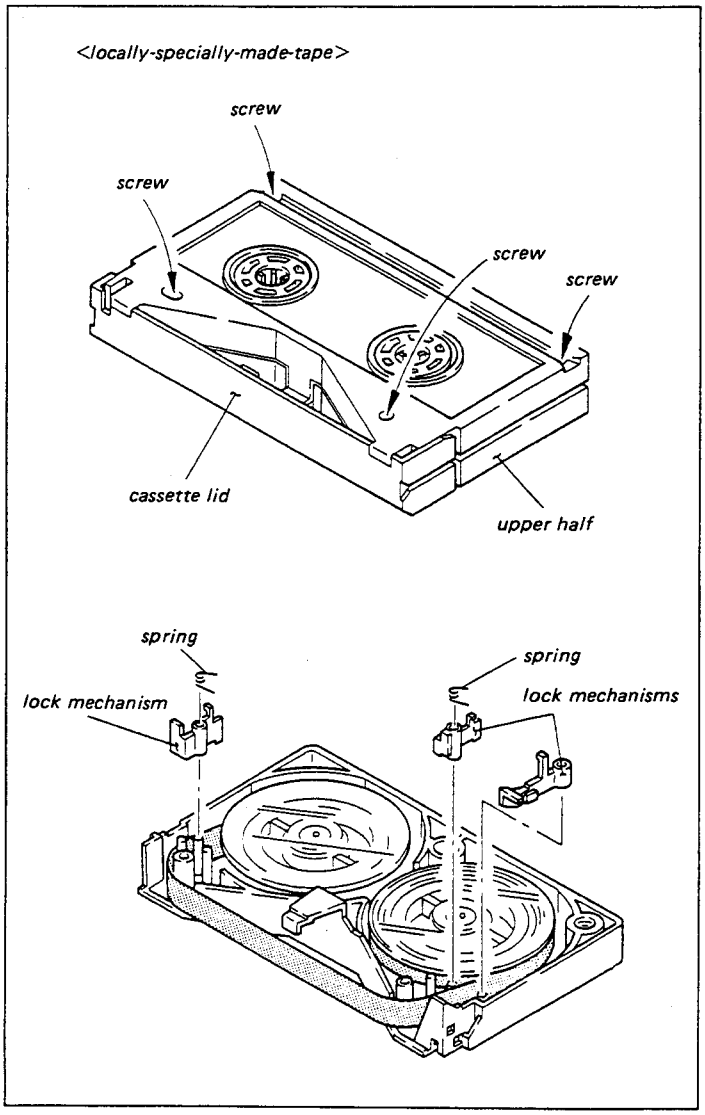
The cassette tape lid removal procedures are as follows:

(1) Remove the four screws on the back of the cassette as shown in figure, and remove the upper half of the cassette.

(2) Remove the lock mechanism parts and the springs on the left and right.

(3) Remove the cassette lid from the upper half.

(4) Install the upper half on the lower half with four screws from the back side.



## 5-1. REEL TABLE HEIGHT ADJUSTMENT

**Mode:** Unthread end

**Tool:** Cassette reference plate

**Check procedure:**

(1) Put the cassette reference plate on the cassette position.

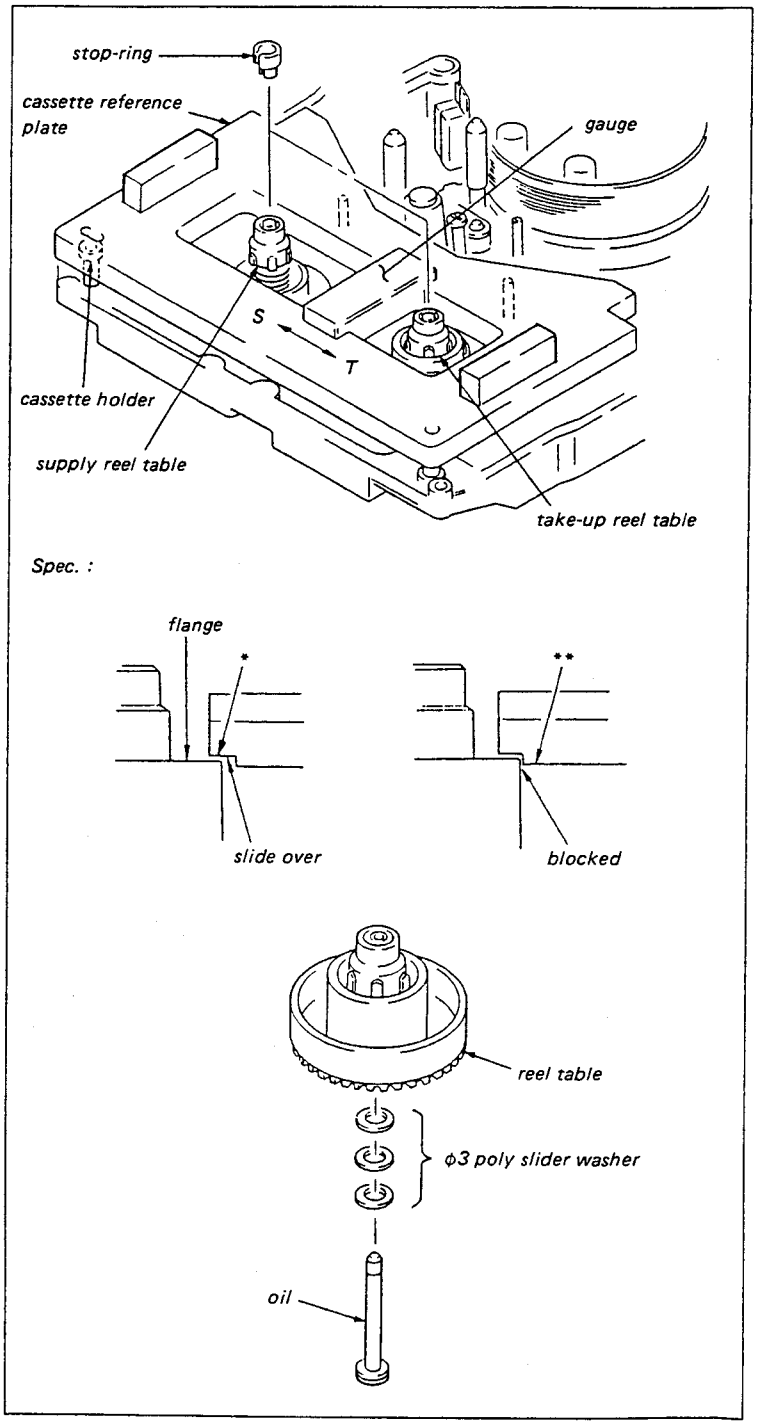
(2) Move the gauge as shown in the figure. Rotate by hand each reel table, by 120°. Check that the * marked portion of the gauge can slide over the reel table, while the ** marked portion is blocked and not be able to slide over the reel table.

**Adjustment procedure:**

(1) Select the poly slider washer under the reel table so that the check pocedure (2) is satisfied. However at least one poly slider washer should be placed. When two or more poly slider washers are neccessary, the thicker one should be placed under the thinner ones.

(2) Apply a small drop of sony oil as shown in the figure. Install the reel table.

. poly slider washers for adjustment
3mm dia.
0.13mm thick : 3-701-439-01
0.25mm thick : 3-701-439-11
0.5 mm thick : 3-701-439-21



## 5-2. MAIN BRAKE CLEARANCE ADJUSTMENT

**Mode:** Unthread end

**Tool:** Wire clearance gauge

**Check procedure:**

(1) Push the iron core of the brake solenoid into fully energized position. (The main brake is released.)

(2) Check that the clearance between the T main brake shoe and the T reel table meets the required specification.

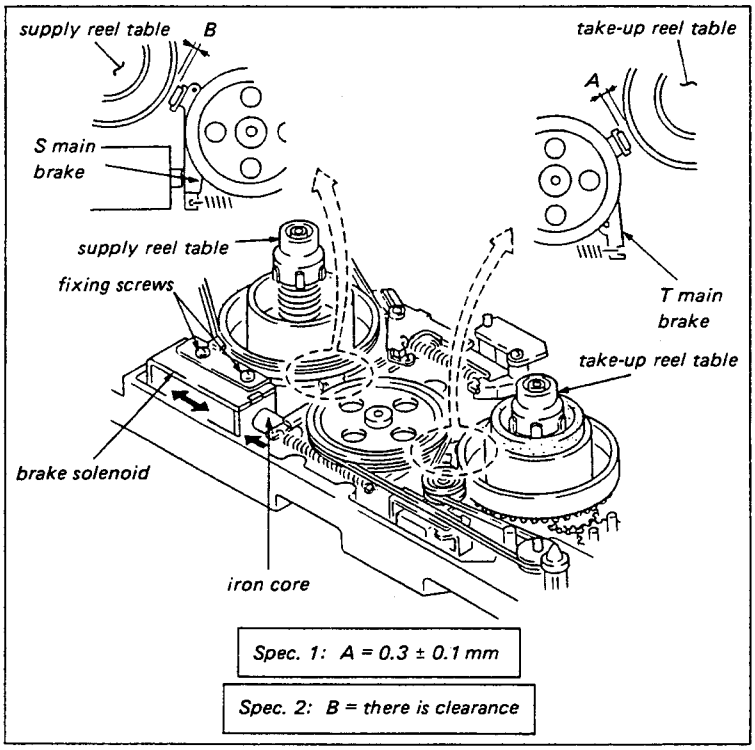
(3) Check that the clearance between the S main brake shoe and the S reel table meets the required specification.

**Adjustment procedure:**

(1) Loosen the brake solenoid fixing screws by 1/2 to 1 turn.

(2) Move the solenoid slightly in the direction of the arrow.

(3) Tighten the fixing screws. And check again.




## 5-3. SOFT BRAKE CLEARANCE ADJUSTMENT

**Mode:** PLAY

**Tool:** Wire clearance gauge

**Check procedure:**

(1) Push the tension regulator arm ass'y by hand to the take-up side reel table, and release the brake band from the reel table.

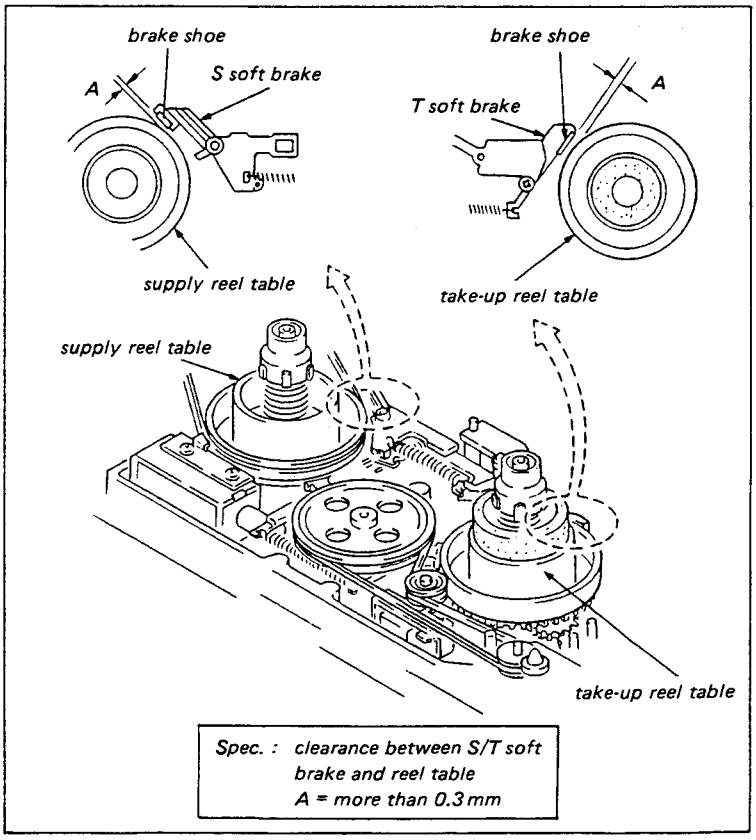
(2) Check that the clearance between the S reel table and the S soft brake shoe meets the required specification.

(3) Check that the clearance between the T reel table and the T soft brake shoe meets the required specification.

**Adjustment procedure:**

(1) Replace the S soft brake ass'y.

(2) Replace the T soft brake ass'y.



## 5-4. THREADING RING ROTATION ADJUSTMENT

. This adjustment is required only when the threading ring and/or one of the ring rollers are replaced.

**Tool:** Wire clearance gauge (0.1mm)
Sony grease

**Adjustment procedure:**

(1) Rotate clockwise the manual gear of the gear ass'y by phillips type screw driver , and move the T drawer guide slantness arm in the direction of the arrow. Stop rotating it when the T drawer guide slantness arm comes just above the fixing screw of the gear ass'y.

(2) Loosen the fixing screw of the ring roller (3). Push the ring roller (3) in the direction A.

(3) Put the threading ring ass'y along the groove of the ring rollers (1) and (2). Tighten the fixing screw of the ring roller (3), snugly.

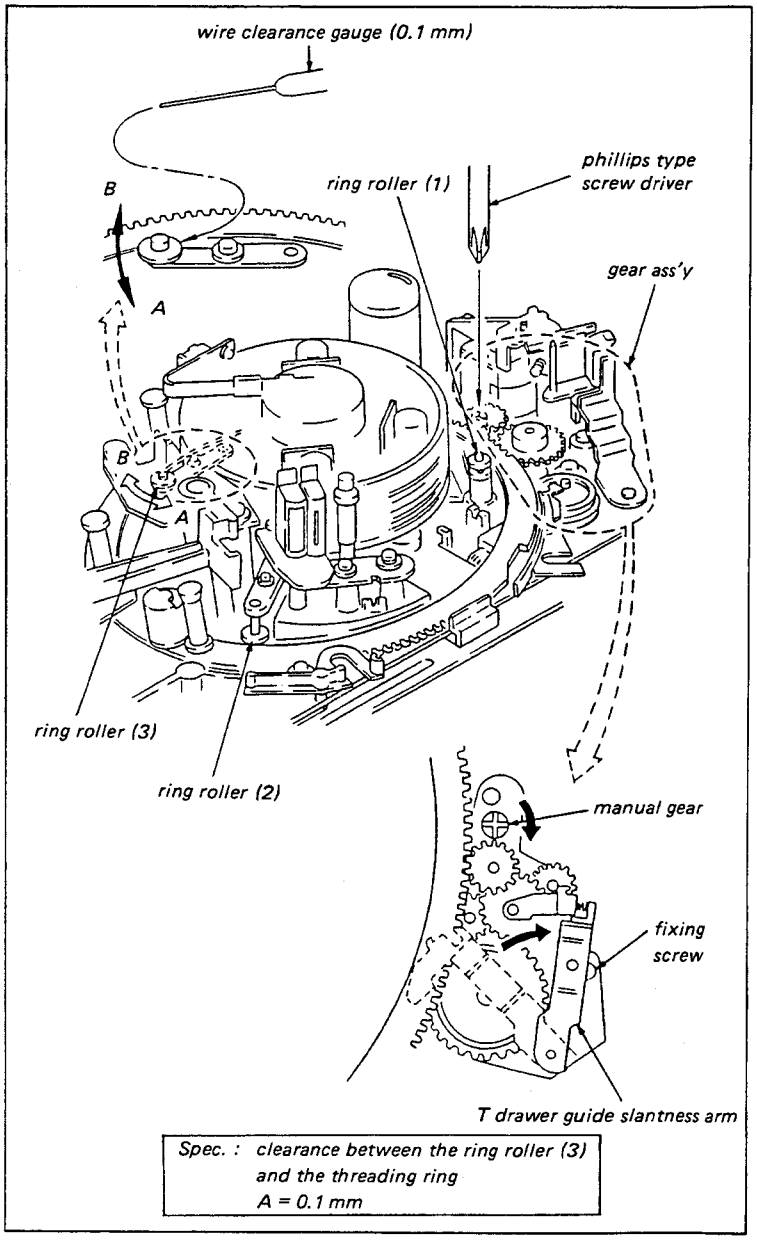
(4) Insert the wire clearance gauge (0.1mm) between the groove of the ring roller (3) and the threading ring. Pressing the roller onto the ring in the direction B, tighten the fixing screw of the ring roller (3).

(5) Remove the wire clearance gauge. While rotating the threading ring clockwise and counterclockwise 2 to 3 times, check the specification again.

(6) Apply Sony grease on the inside of the threading ring. Be sure not to grease the guides.

(7) Clean the pinch roller with a cleaning piece moistened with the cleaning fluid.

(8) After the adjustment, the following adjustment is necessary: Sec.5-5. Gear Ass'y Position Adjustment.



## 5-5. GEAR ASS'Y POSITION ADJUSTMENT

**Tool:** Wire clearance gauge (0.2mm)

**Adjustment procedure:**

(1) Put the threading ring into the unthreading end position. Check that there is no clearance between the unthreading end roller and the stopper.

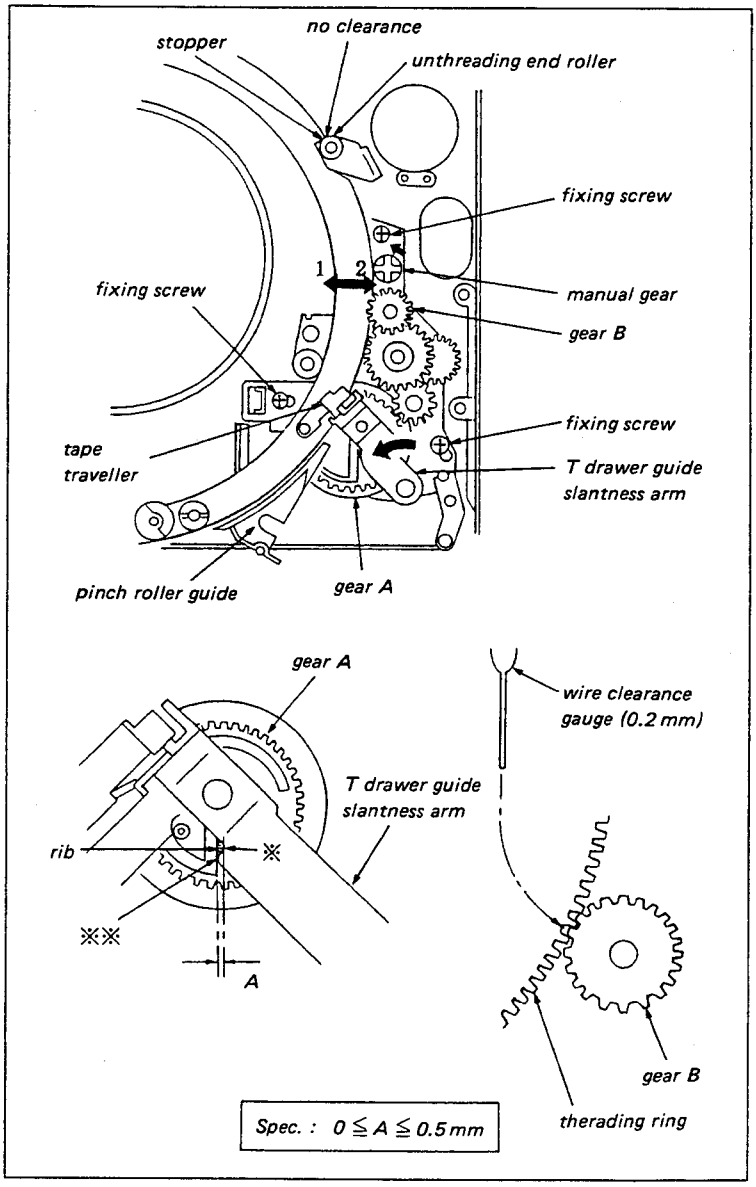
(2) Loosen the 3 fixing screws of the gear ass'y by a half turn. Move by hand the gear ass'y in the direction 2, and shift the gear B out of the threading ring.

(3) Rotate counterclockwise the manual gear by a phillips type screw driver. Adjust the position of the T drawer guide slantness arm and gear A's rib so that the specification is satisfied.

. Be sure to move the T drawer guide slantness arm in the direction of the arrow by rotating the manual gear counterclockwise, and watch the specification. When the T drawer guide slantness arm goes over the gear A's rib, rotate the manual gear clockwise until the clearance between the tape traveller and the pinch roller guide becomes 2 to 3mm. Rotate the gear counterclockwise again, and watch the spec.

(4) Insert the wire clearance gauge (0.2mm) between the gear B and the threading ring. Move the gear ass'y in the direction 1.

(5) Tighten the 3 fixing screws. Remove the wire clearance guage.



## 5-6. THREAD-END POSITION ADJUSTMENT

**Check procedure:**

(1) Put the unit into the thread-end mode.

(2) Rotate the threading ring by the manual gear, and put the unit into the PLAY mode. During that, check that the center of the capstan shaft, the hole on the pinch lever and the pinch roller are on the same line as shown in the figure.

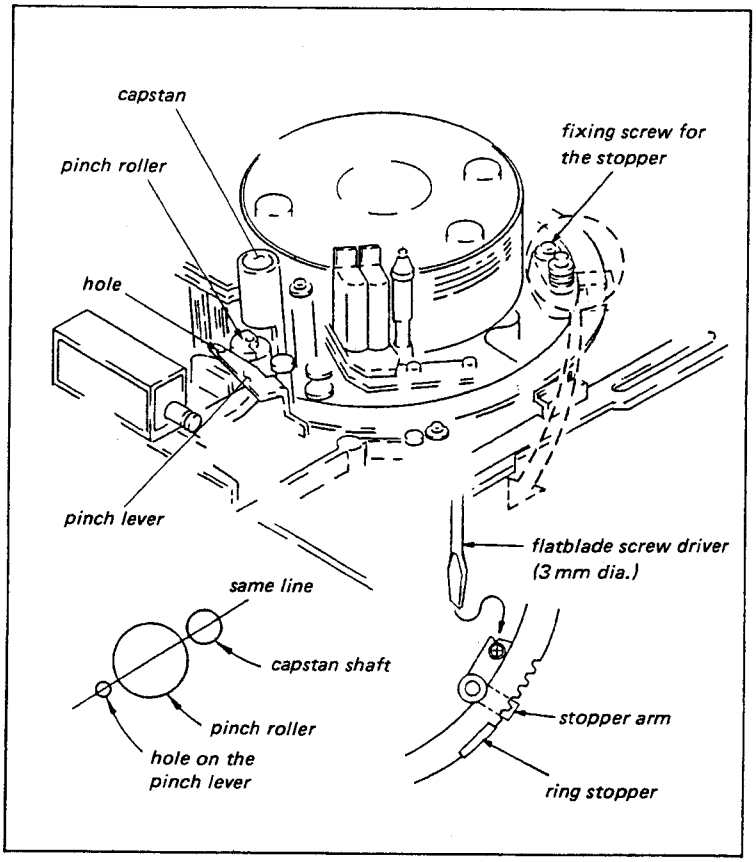
**Adjustment procedure:**

(1) Loosen the stopper fixing screw by 1/4 to 1/2 turn.

(2) Put a flatblade screwdriver between the notch of the ring stopper and the boss. Press the ring stopper to the stopper arm, and adjust so that the specification is satisfied.

(3) Tighten the fixing screw of the stopper.

(4) Put the unit into unthreading and threading modes continuously 2 to 3 times, and make confirmation of the adjustment.



## 5-7. PINCH PRESS ASS'Y POSITION ADJUSTMENT

**Mode:** PLAY

**Check procedure:**

(1) Check that the clearances between the * marked portion of the pinch roller and the upper and the lower of the pinch press lever satisfies the required specification. (spec. 1)

(2) Check that the position of the ** marked portion of the pinch roller and the upper and the lower of the pinch press lever satisfies the required specification. (spec. 2)

(3) Check that the clearance between the pinch press levers a and b satisfies the required specification. (spec. 3)

(4) Check that the clearance between the release lever and the release roller satisfies the required specification. (spec. 4)

(5) Push by a flatblade screw driver the iron core of the plunger solenoid into the fully energized position, and release the pinch press. Check that the clearance between the pinch roller and the capstan shaft satisfies the required specification. (spec. 5)

**Adjsutment procedure:**

. When the spec. 1 is not satisfied:

(1) Loosen the two fixing screws, and put a flatblade screw driver as shown in the figure. Adjust so that the specification is satisfied.

. When the spec. 2 is not satisfied:

(2) Replace the poly slider washer under the pinch roller ass'y, so that the spec. 2 is satisfied.

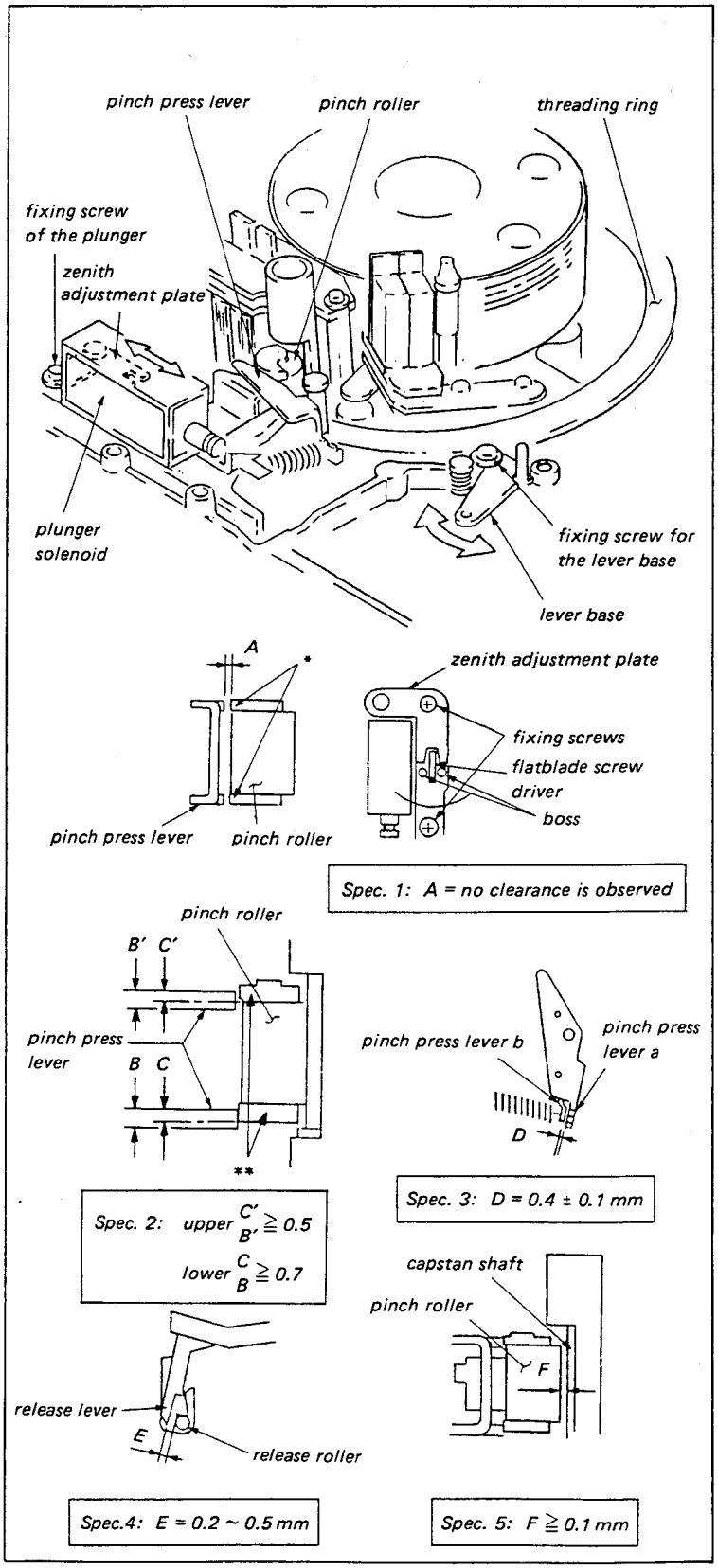
(3) After the replacement, perform the check procedure (1) again.

. When the spec. 3 is not satisfied:

(4) Loosen the mounting screw of the lever base. Adjust by moving the lever base in the direction of the arrow.

. When the spec. 4 is not satisfied:

(5) Loosen the mounting screw of the plunger solenoid. Adjust by moving the plunger solenoid in the direction of the arrow.



. When the spec. 5 is not satisfied:

(6) Repeat the check procedures (4) and (5).

(7) After the adjustments, check again the check procedure (3).

## 5-8. TENSION REGULATOR ADJUSTMENT

### 5-8-1. Tension Regulator Roller Slantness Adjustment

**Mode:** Threading end

**Tool:** Cassette reference plate
Tension regulator slantness check jig

**Check procedure:**

(1) Put the cassette reference plate on the cassette position.

(2) Push the designated position of the tension regulator arm toward the full erase head so as to contact the tension regulator arm to the boss by finger. (Never remove the finger from the tension regulator arm.)

(3) Check the tension regulator roller's slantness in the directions A and B, using the tension regulator slantness check jig.

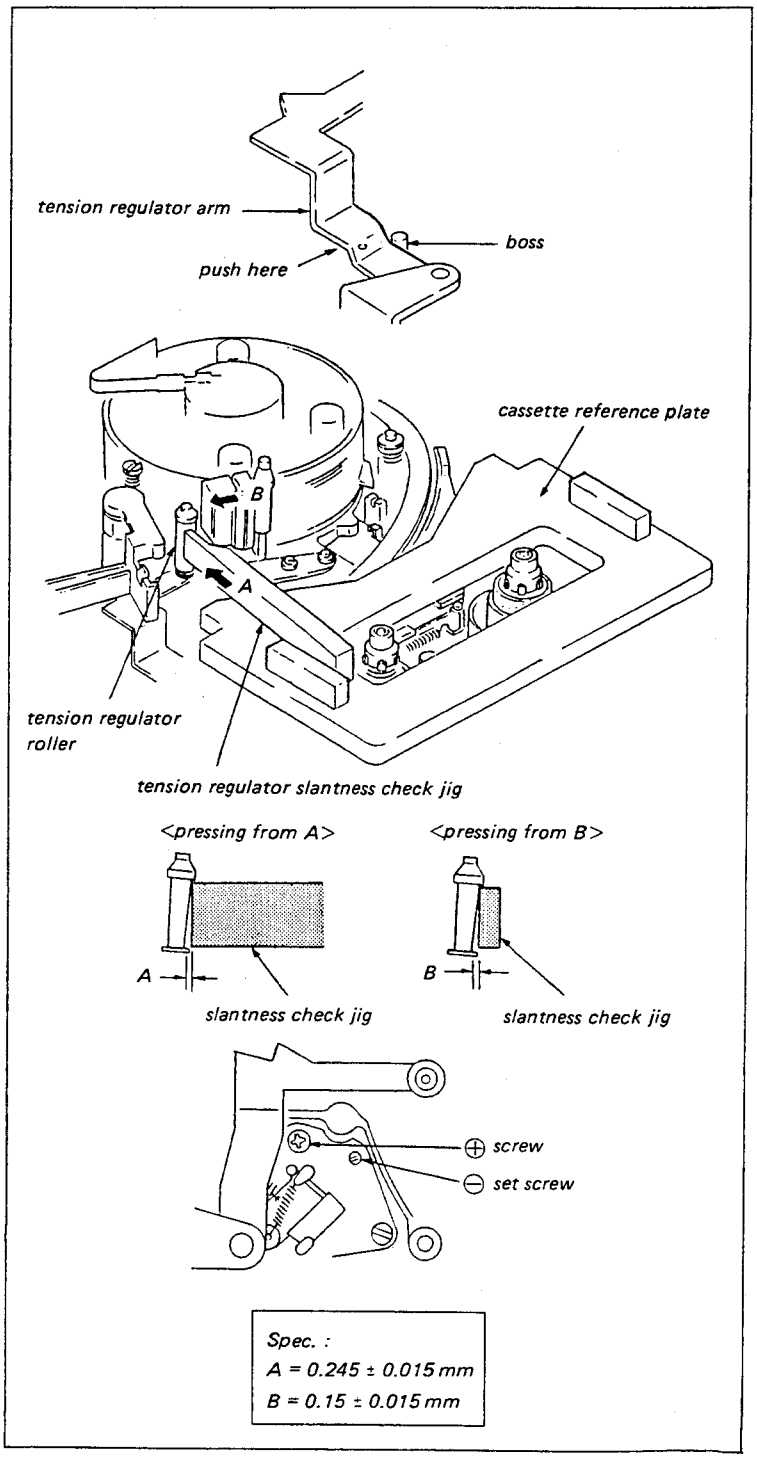
**Adjustment procedure:**

. When the specification is not satisfied in the direction A.

(1) Turn the (-) set screw shown in the figure.
To make narrower the clearance at the bottom, turn counterclockwise this (-) set screw.

. When the specification is not satisfied in the direction B.

(2) Turn the (+) screw shown in the figure.
To make narrower the clearance at the bottom, turn clockwise this (+) screw.



### 5-8-2. Tension Regulator Operating Position Adjustment

**Mode:** PLAY

**Tool:** BCT-20K

Alligator clip (previously modified by a plier or similar tool as shown in the figure.)

**Check procedure:**

(1) Insert the BCT-20G and put the unit into the PLAY mode. Check that the specification is satisfied.

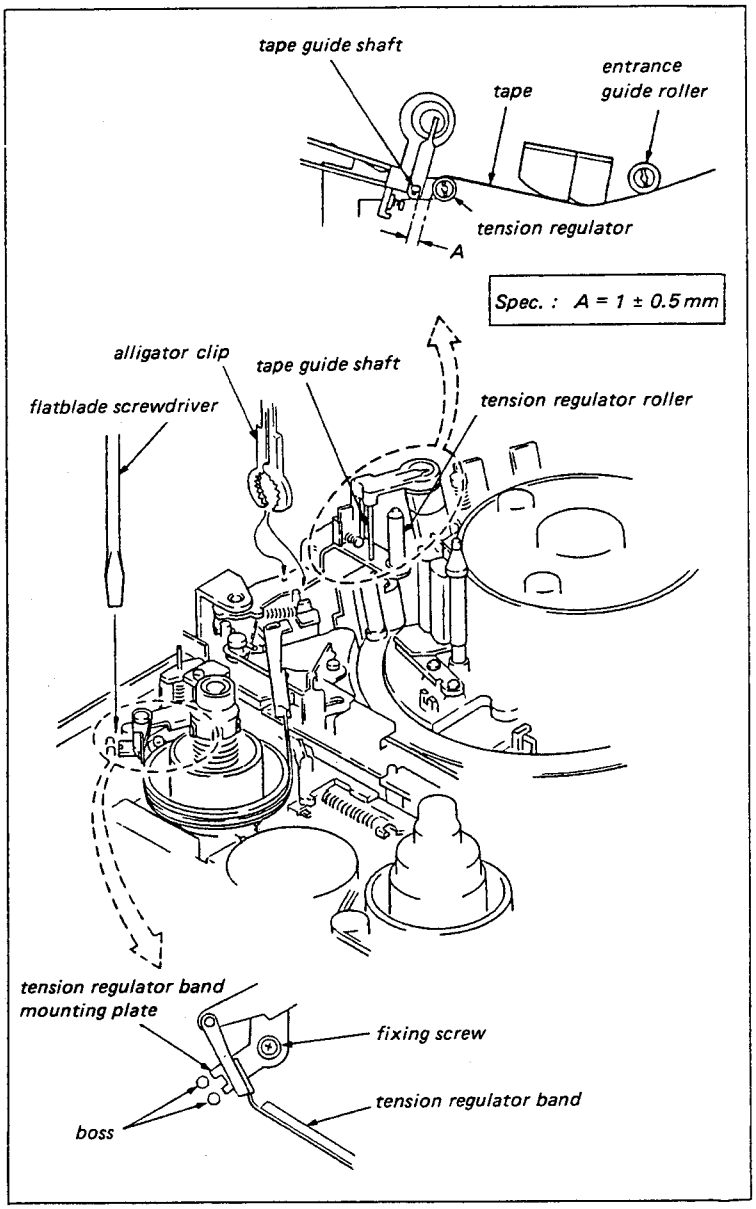
**Adjustment procedure:**

(1) Loosen the fixing screw of the tension regulator band mounting plate by 1/3 to 1 turn.

(2) Clip the tension regulator arm and the boss using the alligator clip. Adjust the position of the tension regulator band mounting plate as shown in the figure.

(3) Check again.

(4) After this adjustment, the following adjustment is necessary:
Sec. 5-8-3. Pull Rod Ass'y Position Adjustment



### 5-8-3. Pull Rod Ass'y Position Adjustment

**Mode:** PLAY

**Tool:** Wire clearance guage (0.2 - 0.4mm)
Alligator clip (previously modified by a plier or similar tool as shown in the figure.)

**Check procedure:**

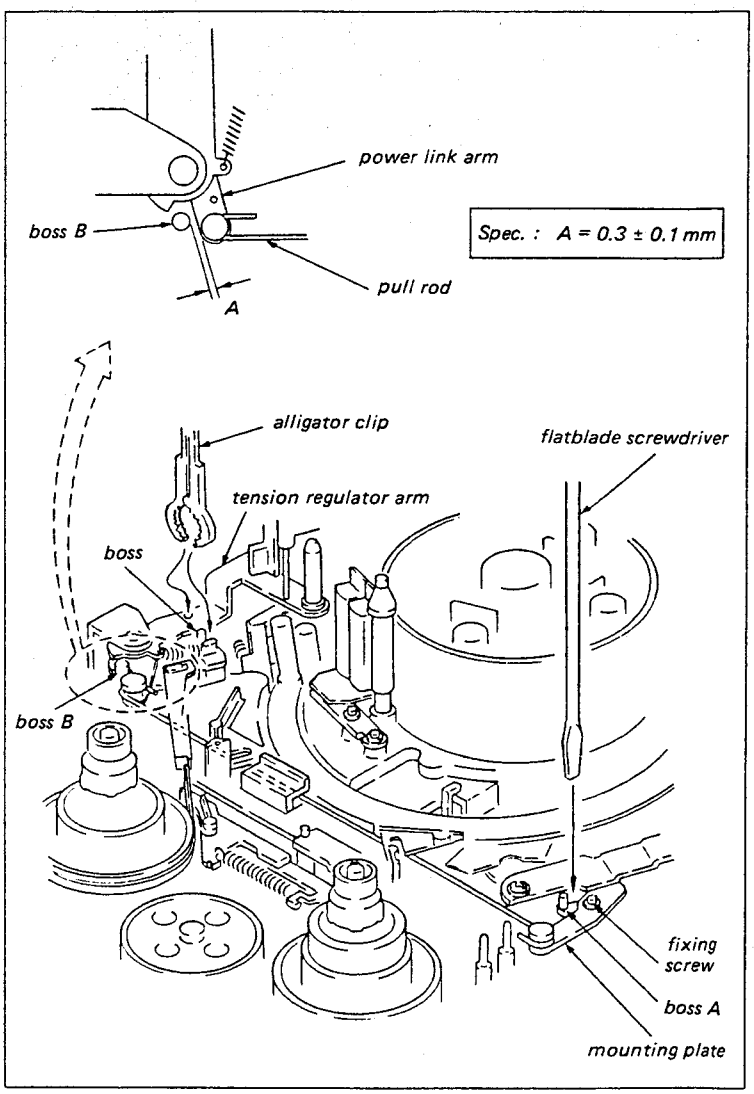
(1) Clip the tension regulator arm and the boss by the alligator clip.

(2) Check that the clearance between the power link arm and the boss B meets the required specification.

**Adjustment procedure:**

(1) Loosen the fixing screw of the mounting plate by 1/2 to 1 turn.

(2) Put the flatblade screwdriver between the mounting plate and the boss A. Adjust the position of the mounting plate.



## 5-9. BRUSH POSITION ADJUSTMENT FOR SLIP RING

**Check procedure:**

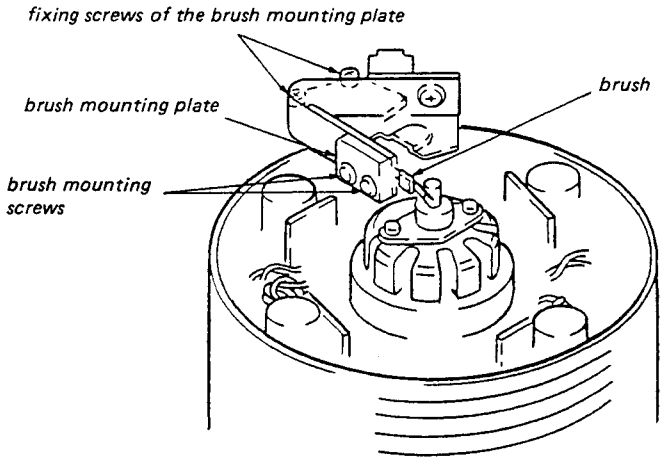
(1) Check that the brush and the slip ring's gap are at the same height. (Spec. 1)

(2) Check that the position of the slip ring and the brush satisfies the required specification (2).

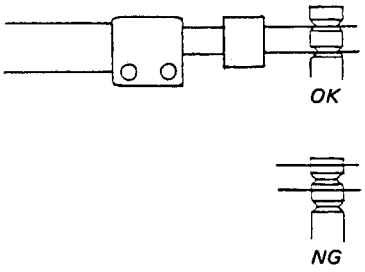
**Adjustment procedure:**

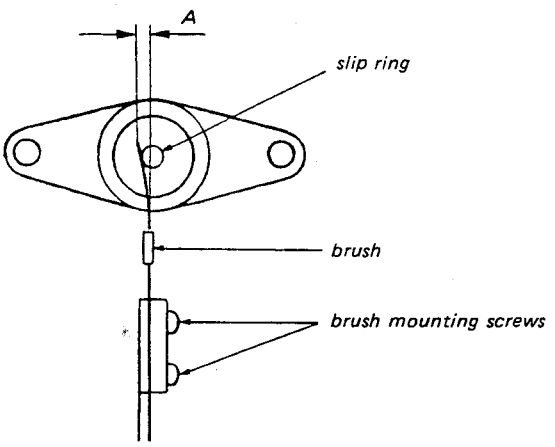
(1) When specification 1 is not satisfied:
Loosen the brush mounting screws, and adjust so that the specification is satisfied.

(2) When specification 2 is not satisfied:
Loosen the fixing screws of the brush mounting plate shown in the figure. Press the brush onto the slip ring so that the specification is satisfied.




*Spec. 1:*




*Spec. 2: A = 2.4 ± 0.4 mm*

# SECTION 6
# BACK TENSION AND TORQUE ALIGNMENT

## ALIGNMENT INFORMATION

### MODE

. **Unthreading-end mode**
Unthreading-end mode is equal to the EJECT mode. The threading guides, the tension regulator arm and the threading ring are at the cassette tape side.

. **Threading-end mode**

(1) Power on the unit.
(2) Push the cassette-in shaft until the threading ring's rotation stops.

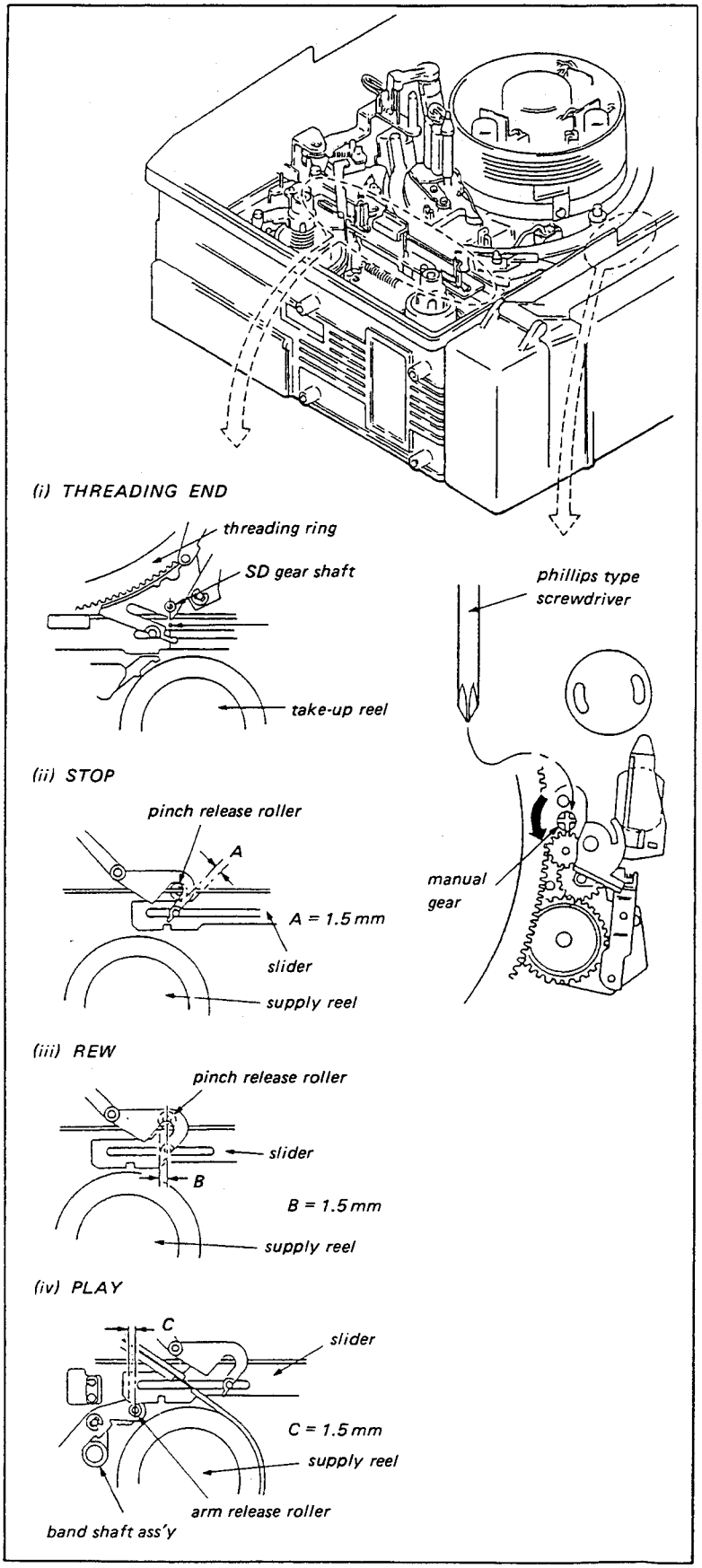
. **PLAY mode without a cassette tape**

(1) Power on the unit.
(2) Push the cassette-in shaft until the threading ring's rotation stops.
(3) Push the PLAY button.

. **PLAY mode**

(1) Power on the unit.
(2) Insert a cassette tape to the unit.
(3) Push the PLAY button.

. Even if a power supply is not available, modes (i) to (iv) can be obtained mechanically, by rotating the manual gear. The modes are limited by the slider's position, as shown in the figure. Be sure not to rotate the manual gear further on where the unthreading roller stops to the stopper.

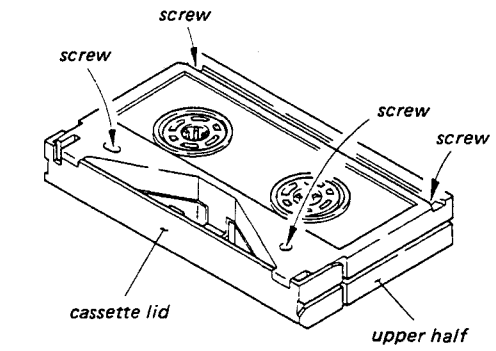


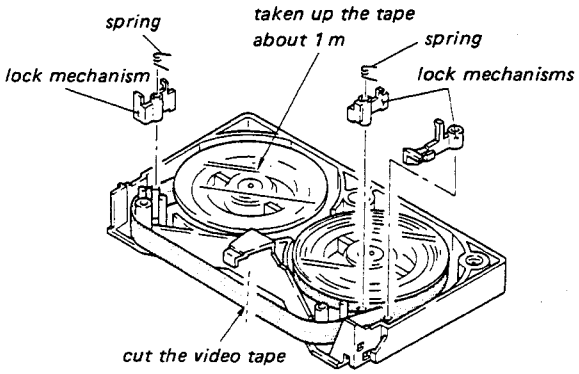
## HOW TO MAKE THE LOCALLY-SPECIALLY-MADE-TAPE

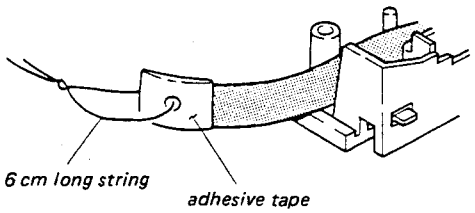
This tape is used for the FWD back tension adjustment. Prepare this tape as follows:

(1) Wind the BCT-20G cassette tape to the tape beginning portion.
(2) Remove the four screws on back of the cassette tape, and remove the upper half of the cassette.
(3) Remove the lock mechanism parts and the springs on the left and right.
(4) Remove the cassette lid from the upper half.
(5) Taken up the video tape on the take-up reel about 1 meter. Cut the video tape at the position as shown in figure. Remove the take-up reel from the cassette. (The take-up reel is used for torque measurement as a locally-specially-made-reel.)
(6) Attach an adhesive tape on an end of the tape at the supply side and make a hole on the adhesive tape.
(7) Make a loop of 6cm long string through the hole.
(8) Install the upper half on the lower half with four screws from the back side.

<locally-specially-made-tape>



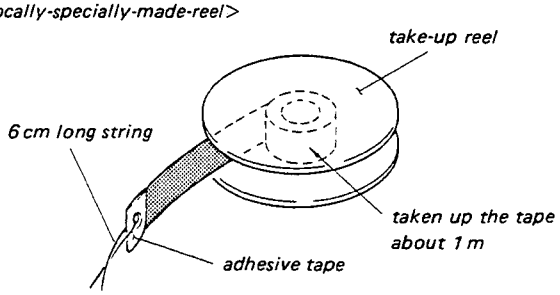




## HOW TO MAKE THE LOCALLY-SPECIALLY-MADE-REEL

This is used for the torque measurement. This reel is the take-up reel that is removed in "locally-specially-made-tape".

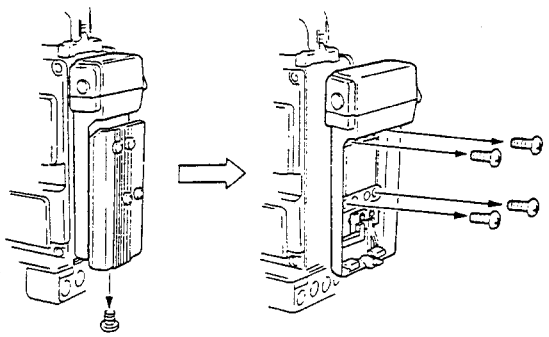
(1) Remove the take-up reel referring the step (5) "How to make the locally-specially-made-tape".
(2) Attach an adhesive tape on an end of the tape at the take-up side and make a hole on the adhesive tape.
(3) Make a loop of 6cm long string through the hole.

<locally-specially-made-reel>




## REMOVING PROCEDURE OF BATTERY CASE

(1) Remove the fixing screw, and remove the battery case cover.
(2) Remove the four fixing screws, and remove the battery case from the unit.



## 6-1. S SOFT BRAKE TORQUE ADJUSTMENT

**Mode:** STOP

**Tool:** Locally special made reel (Refer to the alignment information.)
Tension scale (20g full scale)

**Check procedure:**

(1) Wind clockwise the tape of the locally special made reel.

(2) Remove the battery case.

(3) Put the locally special made reel on the S reel table. Thread the tape through the square-shaped hole as shown in the figure.

(4) Hook a tension scale to the end of the tape.

(5) Push by a flatblade screwdriver or similar tool the iron core of the brake solenoid into the fully energized position. Release the S main brake from the reel table.

(6) Pull out the tape in the direction of the arrow at a constant speed of 12cm/sec.. Check the specification is satisfied or not.

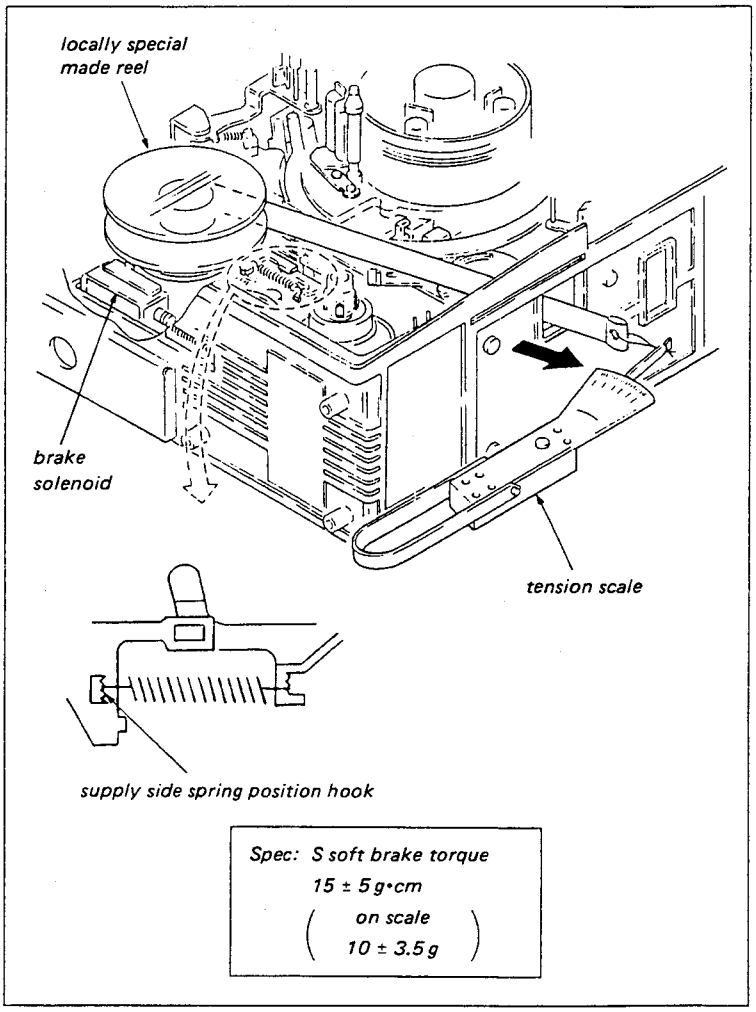
**Adjustment procedure:**

(1) Clean the surface of the S reel table at which the S soft brake touches, with a cleaning piece moistened with cleaning fluid.

(2) Select the spring position of the S soft brake so that it meets the required specification.

(3) After the adjustment, the following adjustment is necessary.
Sec. 6-2. T Soft Brake Torque Adjustment

**NOTE:** Check that the idler gear is not contact with the S reel table.




*Spec: S soft brake torque*
*15 ± 5 g•cm*
*( on scale 10 ± 3.5 g )*

## 6-2. T SOFT BRAKE TORQUE ADJUSTMENT

**Mode:** Thread end

**Tool:** Locally special made reel (Refer to the alignment information.)
Tension scale (20g full scale)

**Check procedure:**

(1) Wind the tape of the locally special made reel counterclockwise.

(2) Remove the battery case.

(3) Put the locally special made reel on the T reel table. Thread the tape through the square-shaped hole as shown in the figure.

(4) Hook a tension scale to the end of the tape.

(5) Push by a flatblade screwdriver or similar tool the iron core of the brake solenoid into the fully energized position. Release the T main brake from the reel table.

(6) Pull out the tape in the direction of the arrow at a constant speed of 12cm/sec.. Check the specification is satisfied or not.

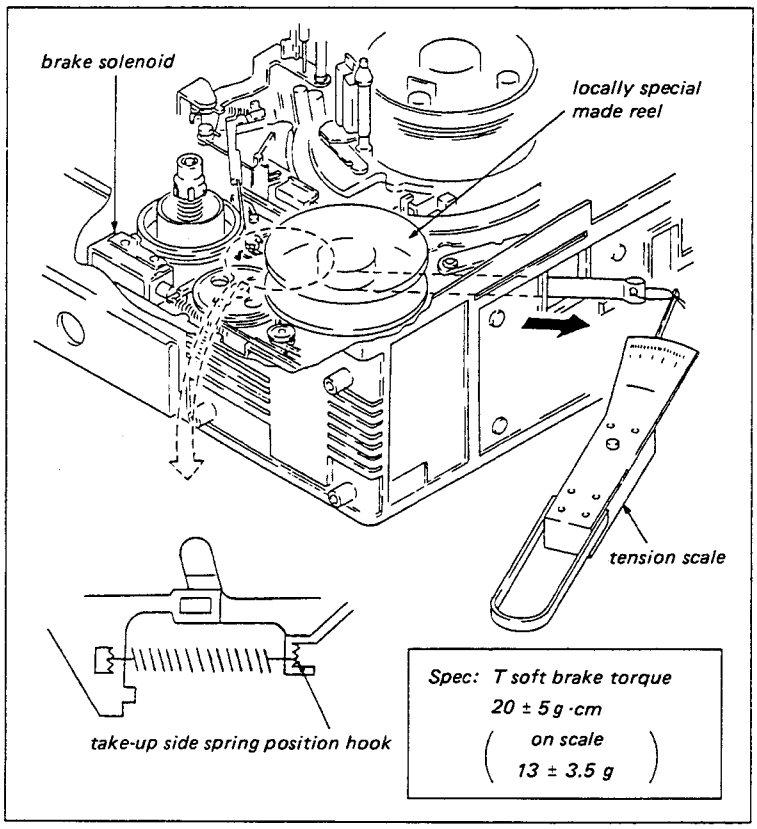
**Adjustment procedure:**

(1) Clean the surface of the T reel table at which the T soft brake touches, with a cleaning piece moistened with cleaning fluid.

(2) Select the spring position of the T soft brake so that it meets the required specification.

(3) After the adjustment, the following adjustment is necessary:
Sec. 6-1. S Soft Brake Torque Adjustment

**NOTE:** Check that the idler gear is not contact with the T reel table.



## 6-3. S SOFT REINFORCEMENT BRAKE TORQUE ADJUSTMENT

**Mode:** Unthread end

**Tool:** Locally special made reel (Refer to the alignment information.)
Tension scale (100g full scale)

**Check procedure:**

(1) Wind counterclockwise the tape of the locally special made reel.

(2) Remove the battery case.

(3) Put the locally special made reel on the S reel table. Thread the tape through the square-shaped hole as shown in the figure.

(4) Hook a tension scale to the end of the tape.

(5) Place the idler gear in the center of S/T reel tables.

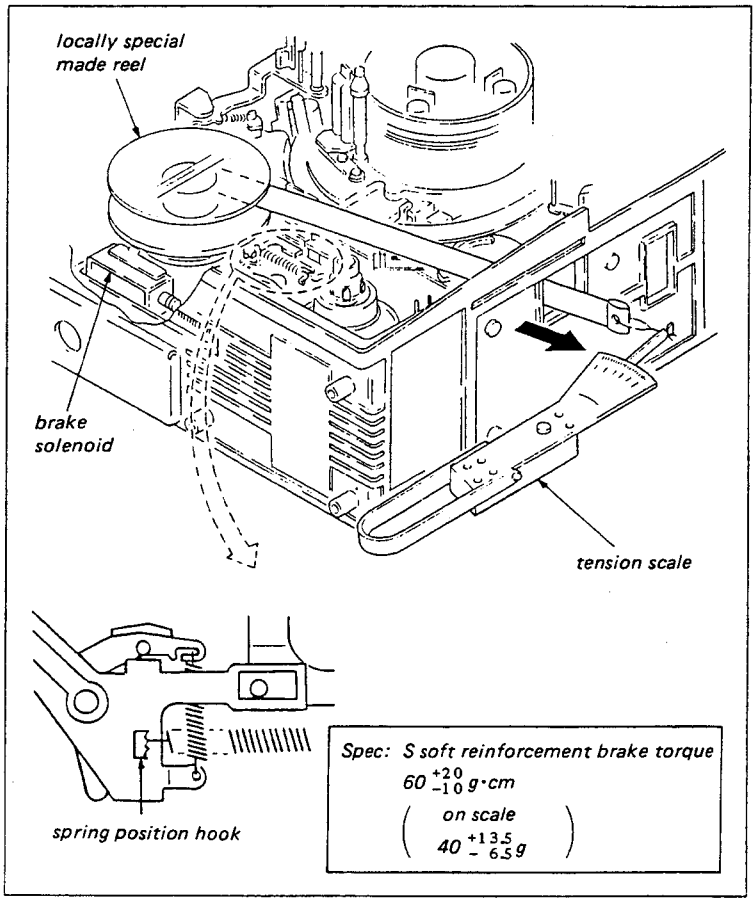
(6) Push by a flatblade screwdriver or similar tool the iron core of the brake solenoid into the fully energized position. Release the S main brake from the reel table.

(7) Pull out the tape at a constant speed of 12cm/sec. in the direction of the arrow. Check the specification is satisfied or not.

**Adjustment procedure:**

(1) Clean the surface of the S reel table at which the S soft brake touches, with a cleaning piece moistened with cleaning fluid.

(2) Select the spring position as shown in the figure.



## 6-4. S MAIN BRAKE TORQUE ADJUSTMENT

**Mode:** STOP

**Tool:** Locally special made reel (Refer to the alignment information.)
Tension scale (100g full scale)

**Check procedure:**

(1) Wind the tape of the locally special made reel clockwise.

(2) Remove the battery case.

(3) Put the locally special made reel on the S reel table. Thread the tape through the square-shaped hole as shown in the figure.

(4) Hook a tension scale to the end of the tape.

(5) Place the idler gear in the center of the S/T reel tables. Push by a flat blade screwdriver or similar tool at the arrowed portion.

(6) Pull out the tape at a constant speed of 12cm/sec. in the direction of the arrow. Check the specification is satisfied or not.

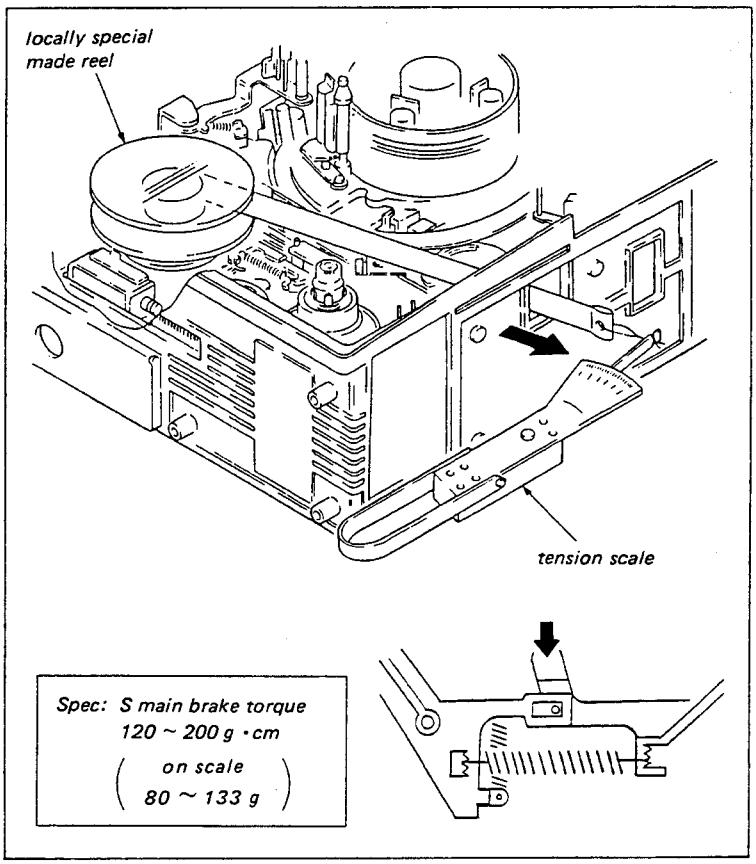
**Adjustment procedure:**

(1) Clean the surface of the S reel table at which the S main brake touches, with a cleaning piece moistened with cleaning fluid.

(2) If the spec. is not satisfied, replace the S main brake arm.

(3) After the replacement, check again.

**NOTE:** Check that the idler gear is not contact with the S reel table.



## 6-5. T MAIN BRAKE TORQUE ADJUSTMENT

**Mode:** STOP

**Tool:** Locally special made reel (Refer to the alignment information.)
Tension scale (100g full scale)

**Check procedure:**

(1) Wind the tape of the locally special made reel counterclockwise.

(2) Remove the battery case.

(3) Put the locally special made reel on the T reel table. Thread the tape through the square-shaped hole as shown in the figure.

(4) Hook a tension scale to the end of the tape.

(5) Place the idler gear in the center of the S/T reel tables. Push by a flat blade screwdriver or similar tool at the arrowed portion.

(6) Pull out the tape at a constant speed of 12cm/sec. in the direction of the arrow. Check the specification is satisfied or not.

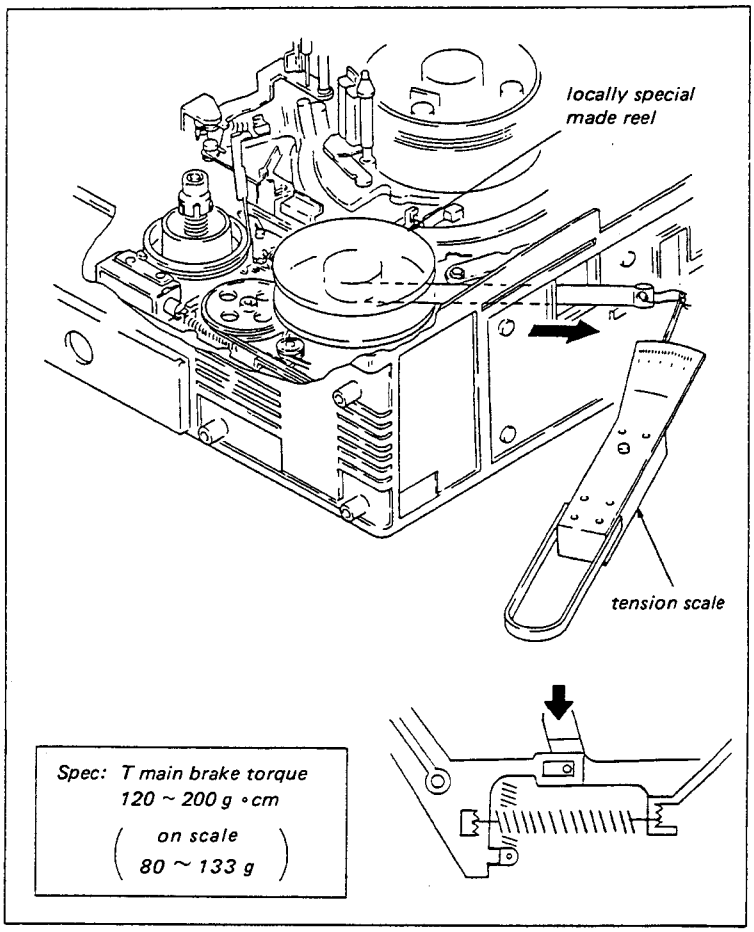
**Adjustment procedure:**

(1) Clean the surface of the T reel table at which the T main brake touches, with a cleaning piece moistened with cleaning fluid.

(2) If the spec. is not satisfied, replace the T main brake arm.

(3) After the replacement, check again.

**NOTE:** Check that the idler gear is not contact with the T reel table.



## 6-6. FWD BACK TENSION ADJUSTMENT

**Mode:** PLAY

**Tool:** Locally special made cassette tape (Refer to the alignment information.)
Tension scale (100g full scale)

**Check procedure:**

(1) Put the unit into the PLAY mode. Set the locally special made cassette tape on the unit.

(2) Remove the battery case.

(3) Thread the tape as shown in the figure. Pull out the tape out of the square shaped hole shown in the figure.

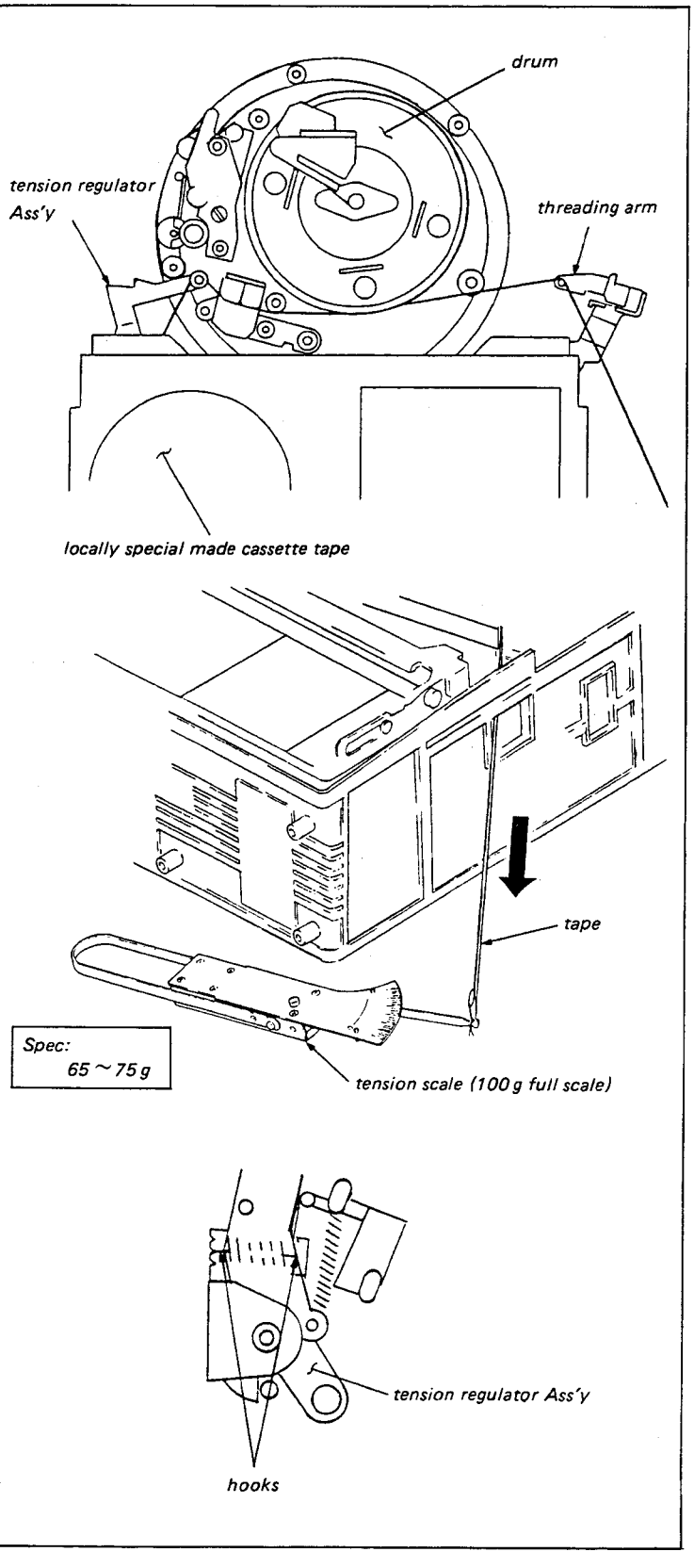
(4) Hook a tension scale to the end of the tape.

(5) Push by a flatblade screwdriver or similar tool the iron core of the brake solenoid into the fully energized position.

(6) Pull out the tape at a constant speed of 12cm/sec. in the direction of the arrow. Check the specification is satisfied or not.

**Adjustment procedure:**

(1) Adjsut the spring position of the tension regulator ass'y so that the specification is satisfied.



## 6-7. FWD TORQUE ADJUSTMENT

**Mode:** PLAY

**Tool:** Locally special made reel (Refer to the alignment information.)
Tension scale (100g full scale)

**Check procedure:**

(1) Remove the battery case.

(2) Put the locally special made reel on the T reel table. Thread the tape through the square-shaped hole as shown in the figure.

(3) Hook a tension scale to the end of the tape.

(4) Push the PLAY button and put the unit into PLAY mode.

(5) Let the tape be taken up at a constant speed of 12cm/sec.. Check the specification is satisfied or not.

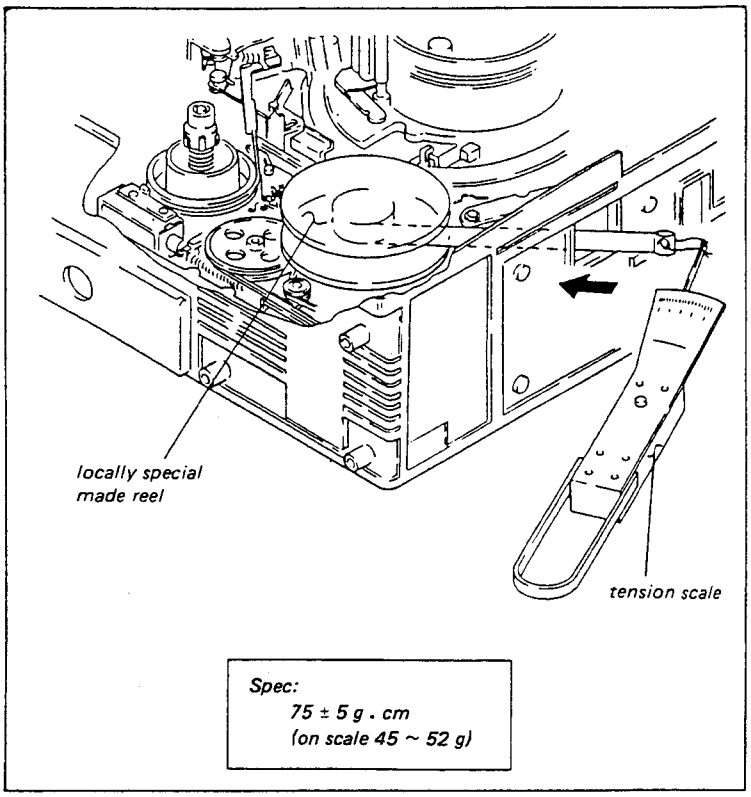
**Adjustment procedure:**

. When the FWD torque is out of the upper limit of the specification:

(1) Turn the RV151/SS-31P board clockwise. Adjust so that the specification is satisfied.

. When the FWD torque is out of the lower limit of the specification:

(2) Turn the RV151/SS-31P board counter-clockwise. Adjust so that the specification is satisfied.




*Spec:*
*75 ± 5 g . cm*
*(on scale 45 ~ 52 g)*

# SECTION 7
# TAPE RUN ALIGNMENT

## ALIGNMENT INFORMATION

### ALIGNMENT TAPE

**. Alignment tape for tracking adjustment**

There are two types of alignment tape for tracking adjustment.

CR2-1PS (8-960-098-02)

| Contents | For use |
|---|---|
| Video, Y track; 4MHz signal<br>(track width; 73u)<br>C track; 5MHz signal<br>(track width; 73u)<br>Audio, blank<br>TC, CTL signal | .CTL delay adjustment |

CR2-1B PS

| Contents | For use |
|---|---|
| Video, Y track; 6MHz signal<br>(track width; 86u)<br>C track; 5MHz signal<br>(track width; 73u)<br>Audio, blank<br>TC, CTL signal | .Video trackig adjustment<br>.CTL head position adjustment<br>.TC head position adjustment<br>.Switching position adjustment |

**Alignment tape for general adjustment**

CR5-2A PS (8-960-098-44)

| TIME<br>min: sec | VIDEO |
|---|---|
| 0 : 00<br>3 : 00 | 75% Color Bars |
| 6 : 00 | Multi Burst<br>Y; 0.5, 1.0, 2.0, 3.0, 4.1, 4.5 MHz<br>C; 0.2, 0.5, 1.0, 1.5 MHz |
| 9 : 00 | Bowtie & 10T |
| 11 : 00 | Pulse & Bar |
| 13 : 00 | Quad Phase |
| 15 : 00 | Composite Monoscope<br>(Switching position is shifted.) |

CR5-1B PS (8-960-096-91)

| TIME<br>min : sec | VIDEO | AFM |
|---|---|---|
| 0 : 00 | RF Sweep<br>Marker; 1, 2, 4, 6, 8, 10, 12 MHz | No-Signal |
| 2 : 00 | 60% H. Sweep (CTDM)<br>Marker; 0.5, 1, 2, 3, 4, 5 MHz | |
| 5 : 00 | Pulse & Bar (CTDM) | |
| 8 : 00 | Multi Burst<br>Y; 0.5, 1, 2, 4, 5, 5.5 MHz<br>C; 0.2, 0.5, 1, 1.5, 2 MHz | |
| 11 : 00 | Pulse & Bar | |
| 14 : 00 | 100% Color Bars | 400 Hz sine wave<br>(25 kHz deviation) |
| 16 : 30 | | (75 kHz deviation) |
| 17 : 00 | 50% Bowtie & 10T | No-Signal |
| 19 : 00 | Line 17A Signal | |
| 22 : 00 | Quad Phase | |
| 24 : 00 | Flat Field | |
| 26 : 00 | 100% Color Bars<br>(with drop out) | |
| 28 : 00 | Composite H. Sweep<br>(with VISC) | |
| 30 : 00 | | |

CR8-1A PS (8-960-098-45)

| TIME min: sec | AUDIO |
|---|---|
| 0 : 00 | 1 kHz／0 VU |
| 2 : 55 | Blank |
| 3 : 00 | 10 kHz／−10 VU |
| 4 : 55 | Blank |
| 5 : 00 | 1 kHz／−20 VU |
| 5 : 55 | Blank |
| 6 : 00 | 40 Hz／−20 VU |
| 6 : 25 | Blank |
| 6 : 30 | 7 kHz／−20 VU |
| 6 : 55 | Blank |
| 7 : 00 | 10 kHz／−20 VU |
| 7 : 25 | Blank |
| 7 : 30 | 15 kHz／−20 VU |
| 7 : 55 | Blank |
| 8 : 00 | 1 kHz sine wave (for audio & CTL height) |
| 10 : 00 | |

CR8-1B PS (8-960-096-86)

| TIME min: sec | AUDIO |
|---|---|
| 0 : 00 | 1 kHz／0 VU (+0.1 dB) |
| 2 : 55 | Blank |
| 3 : 00 | 15 kHz／0 VU |
| 4 : 55 | Blank |
| 5 : 00 | 1 kHz／−20 VU (Ref.) |
| 5 : 55 | Blank |
| 6 : 00 | 40 Hz／−20 VU (+0.0 dB) |
| 6 : 25 | Blank |
| 6 : 30 | 7 kHz／−20 VU (+0.0 dB) |
| 6 : 55 | Blank |
| 7 : 00 | 10 kHz／−20 VU (−0.1 dB) |
| 7 : 25 | Blank |
| 7 : 30 | 15 kHz／−20 VU (−0.2 dB) |
| 7 : 55 | |

MODE

. **Unthreading-end mode**

Unthreading-end mode is equal to the EJECT mode. The threading guides, the tension regulator arm and the threading ring are at the cassette tape side.

. **Threading-end mode**

(1) Power on the unit.

(2) Push the cassette-in shaft until the threading ring's rotation stops.

. **PLAY mode without a cassette tape**

(1) Power on the unit.

(2) Push the cassette-in shaft until the threading ring's rotation stops.

(3) Push the PLAY button.

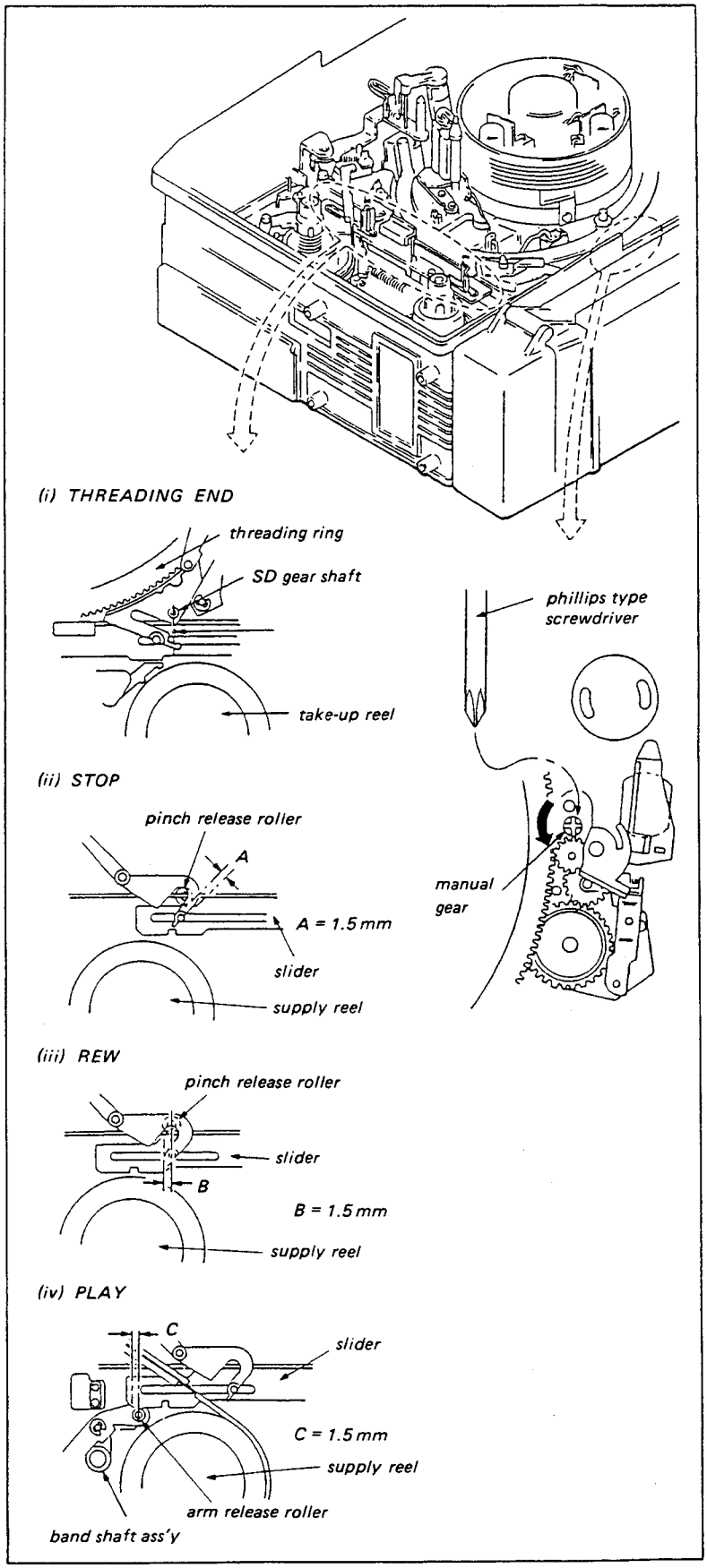
. **PLAY mode**

(1) Power on the unit.

(2) Insert a cassette tape to the unit.

(3) Push the PLAY button.

. Even if a power supply is not available, modes (i) to (iv) can be obtained mechanically, by rotating the manual gear. The modes are limited by the slider's position, as shown in the figure. Be sure not to rotate the manual gear further on where the unthreading roller stops to the stopper.



## HOW TO MAKE THE CASSETTE TAPE WITHOUT LID

Since the VTR is designed compact size, the check and adjustment can not be performed if cassette tape lid is installed.

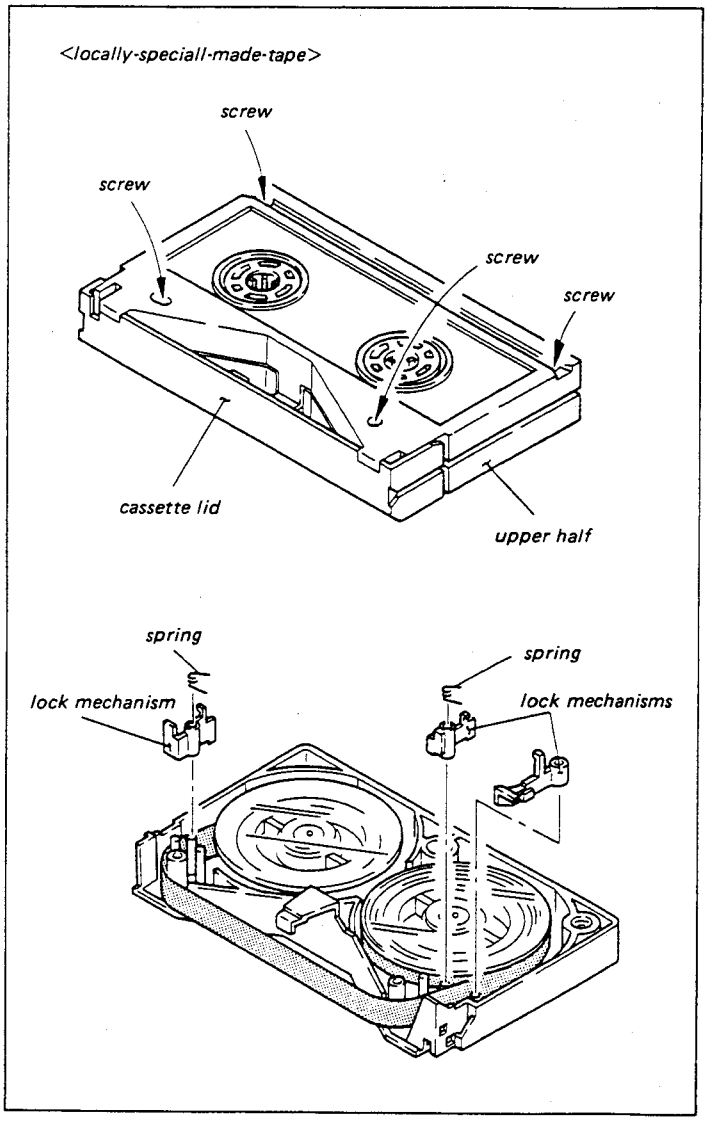
The cassette tape lid removal procedures are as follows:

(1) Remove the four screws on the back of the cassette as shown in figure, and remove the upper half of the cassette.

(2) Remove the lock mechanism parts and the springs on the left and right.

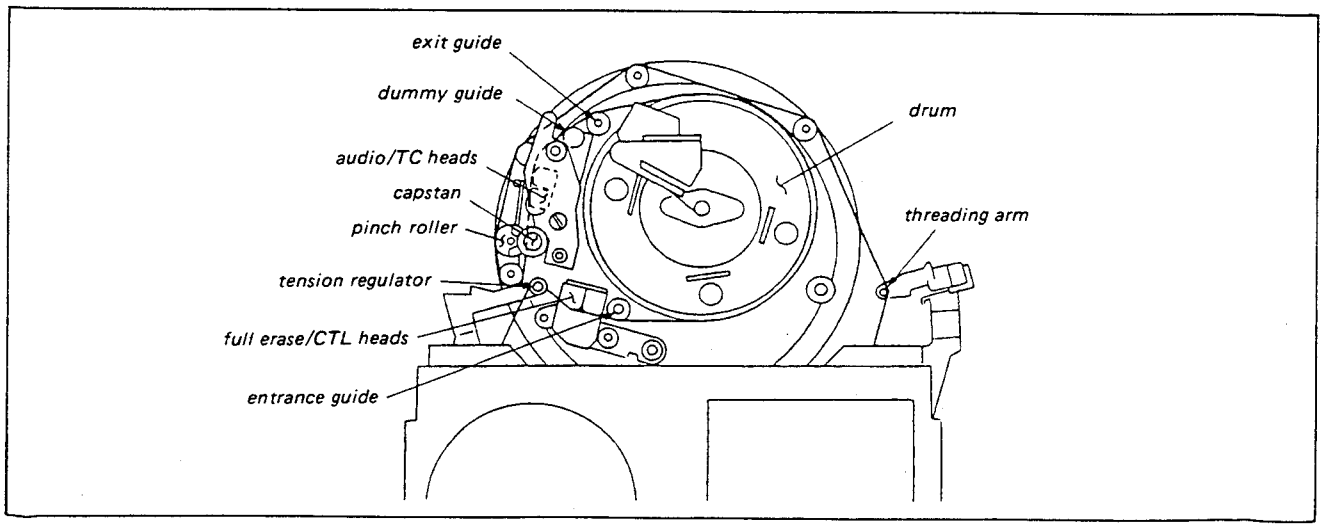
(3) Remove the cassette lid from the upper half.

(4) Install the upper half on the lower half with four screws from the back side.



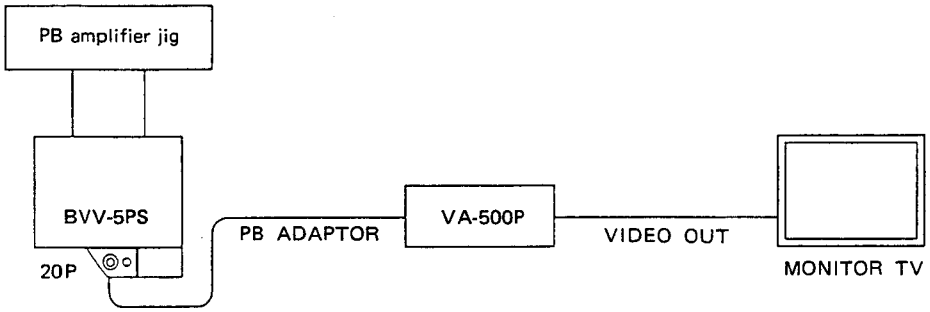

## THE LOCATION OF HEADS AND TAPE GUIDES

The heads and tape guides are located as follows.

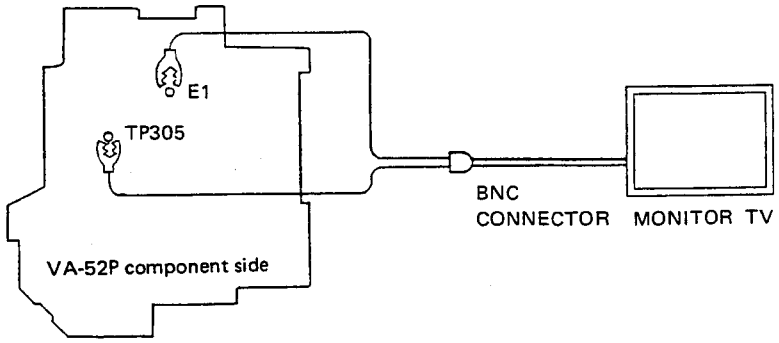


When the PB (playback) amplifier jig, VA-500P and the monitor TV are necessary for the adjustments:

[CONNECTION]




. If the VA-500P is not available:



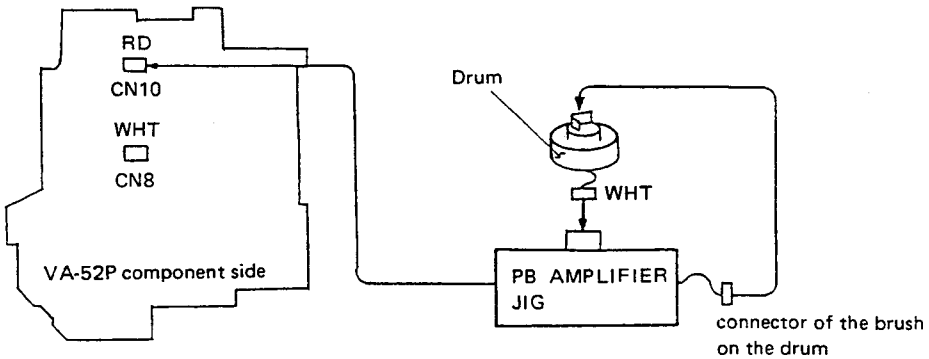

. Connection of the PB amplifier jig

(1) Disconnect the CN8 on the VA-52P, and connect the connector to the input connector of the PB amplifier jig.

(2) Connect the output connector of the PB amplifier fig to the CN10 on the VA-52P.

(3) Disconnect the connector of the brush on the upper drum, and connect the 2P connector from the PB amplifier to that.

(4) Short between the TP33/SS-31P and the GND with a shorting clip. The REC head playbacks the video signal under the PLAY mode.



## 7-1. TAPE RUN ADJUSTMENT

### 7-1-1. Tape Threading Roller Height Adjustment

**Mode:** PLAY, FF and REW modes

**Tool:** Locally special made cassette tape (BCT-20G) without a lid. (Refer to the alignment information)
VA-1VP/VA-5P/BVP-5P or equivalent
Allen wrench (across flat has 0.89mm )

**Check procedure:**

(1) Insert the cassette tape without a lid, and put the unit into the PLAY, FF and REW modes.

(2) Check that the tape touches without any tape curl, to the lower flange of the tape threading guide roller in any mode.

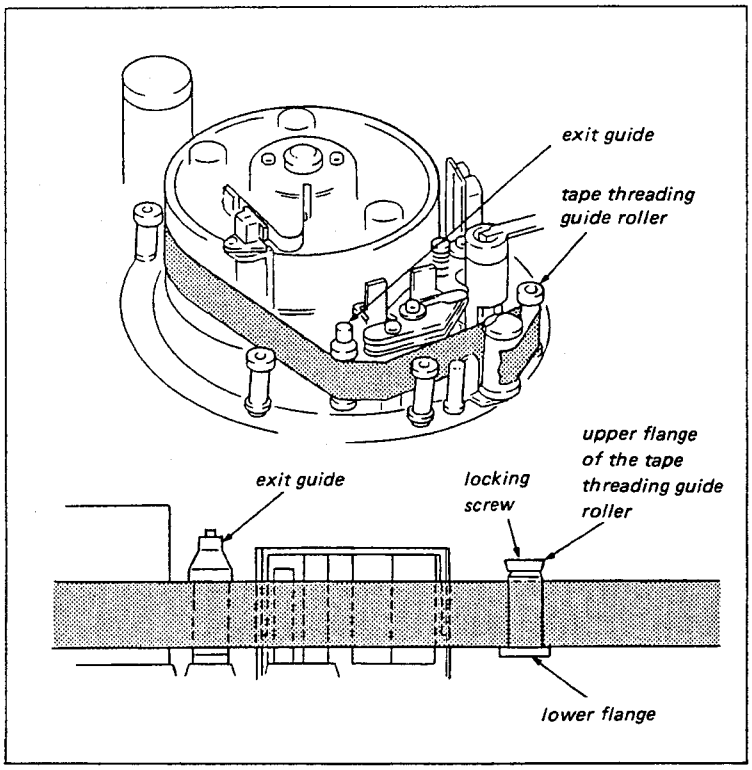
**Adjustment procedure:**

(1) Loosen with an allen wrench (0.89mm) the locking screw on the upper flange of the tape threading guide roller by 1 to 2 turns.

(2) Put the unit into the PLAY mode. Adjust height of the upper flange of the tape threading guide roller so that the required specification is satisfied.

(3) Put the unit into FF and REW modes, check that the tape touches without any tape curl to the lower flange of the tape threading guide roller.

(4) After the adjustment, the following adjustment is necessary:
Sec. 7-2. Video Tracking Adjustment



### 7-1-2. Tape Run Adjustment (around the Pinch Roller)

**Mode:** PLAY

**Tool:** Locally special made cassette tape (BCT-20G) without a lid. (Refer to the alignment information)
VA-1VP/VA-5P/BVP-5P or equivalent

**Check procedure:**

(1) Insert a cassette tape without a lid. (Never use an alignment tape.) Put the unit into the REV mode.

(2) Check that the tape tension is exactly equal between the Audio/TC head and capstan shaft at the portion A.

(3) Check that the tape tension is exactly equal between the pinch roller and the T drawer guide at the portion B.

(4) Push the STOP button and put the unit into STOP mode.

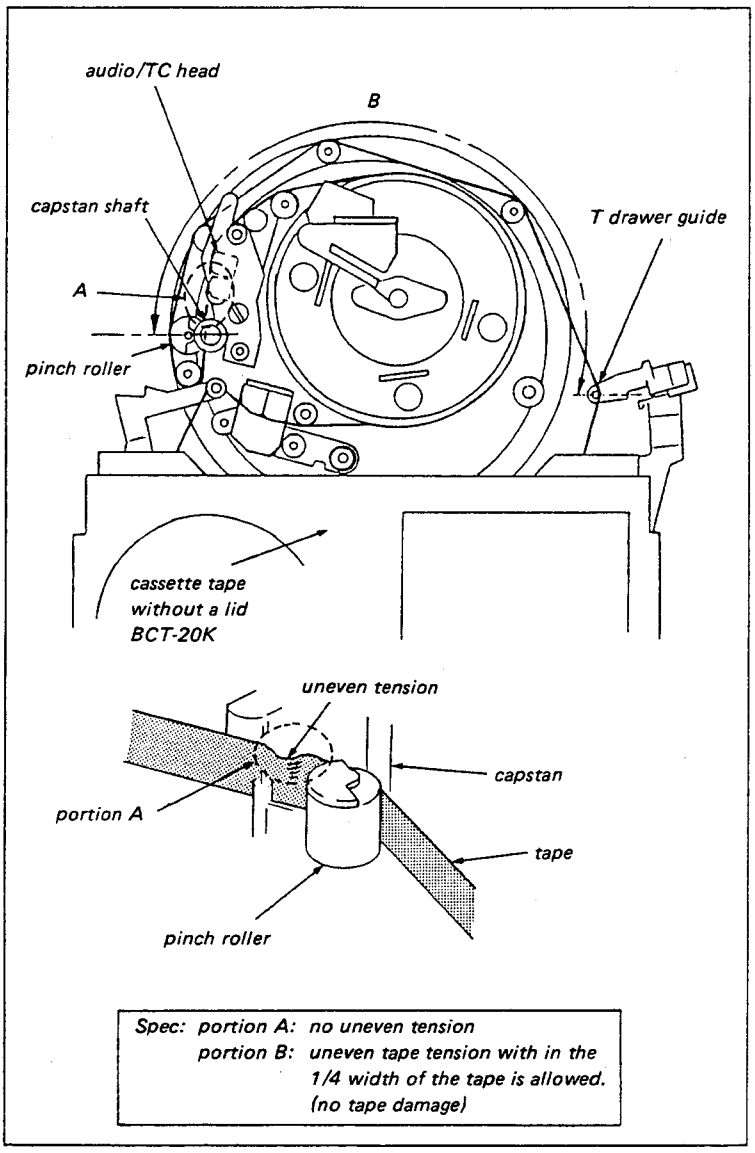
(5) Push the PLAY button and put the unit into PLAY mode.

(6) Repeat the steps (1) to (5), 4 to 5 times, to make confirmation of this check.

**Adjustment procedure:**

(1) Perform the Sec. 7-5-1. Audio/TC Head Zenith Adjustment.

(2) If the specification is not satisfied by step (1), replace the threading ring ass'y After the replacement, Sec. 5-6. Thread end Position Adjustment is necessary.




*Spec: portion A: no uneven tension*
*portion B: uneven tape tension with in the 1/4 width of the tape is allowed. (no tape damage)*

### 7-1-3. Tape Run Adjustment (around the Threading Guide)

**Tool:** Locally special made cassette tape (BCT-20G) without a lid. (Refer to the alignment information)

**Check procedure:**

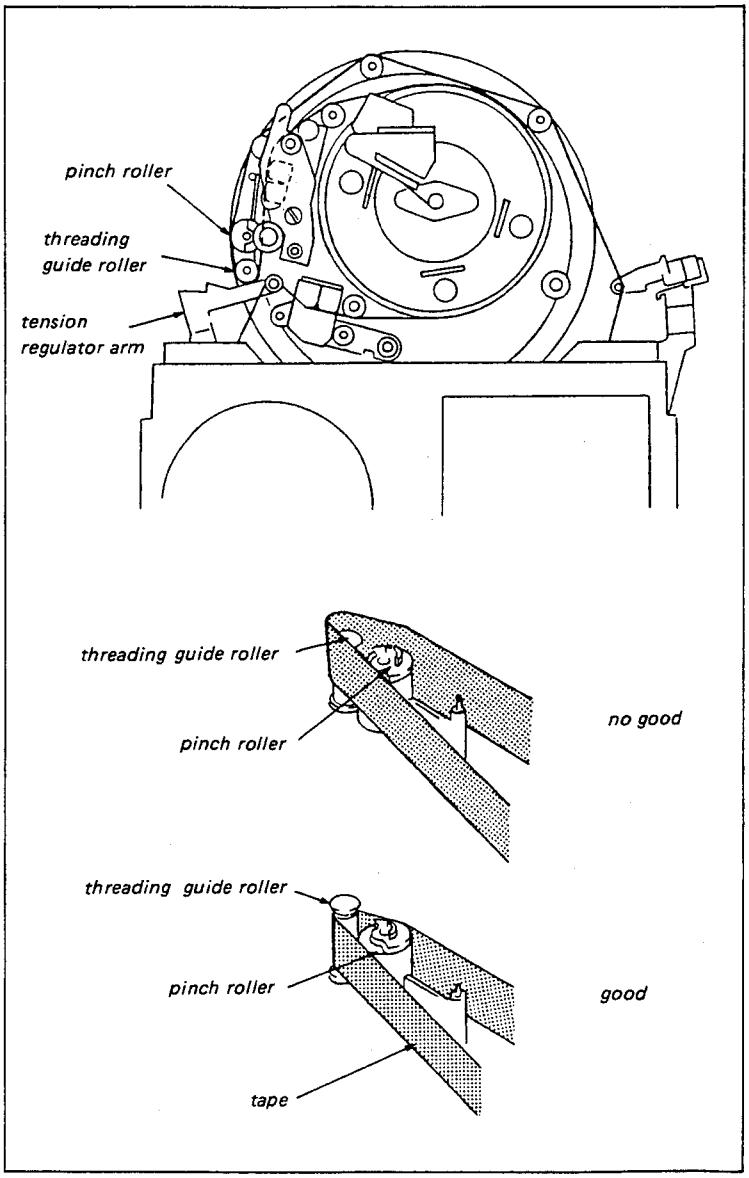
(1) Insert the cassette tape without a lid and rewind it completely to the tape top. Push the EJECT button.

(2) Insert the cassette tape again. Put the unit into the threading mode. Check that the tape runs correct position on the threading guide roller.

(3) Repeat the steps (1) and (2). Check it again.

**Adjustment procedure:**

(1) Replace the threading ring ass'y. Check it again.



### 7-1-4. Tape Run Adjustment (T Drawer Guide Slantness Adjustment)

**Mode:** PLAY - STOP - PLAY

**Tool:** Locally special made cassette tape (BCT-20G) without a lid. (Refer to the alignment information)

**Check procedure:**

(1) Insert a cassette tape without a lid. (Never use an alignment tape.) Put the unit into the PLAY mode.

(2) Check that the tape run position at the take-up side of the cassette tape satisfies the specification 1 as shown in the figure.

(3) Push the STOP button and put the unit into STOP mode.

(4) Push the PLAY button and put the unit into PLAY mode. Check that the tape tension is exactly equal at the illustrated portion A.

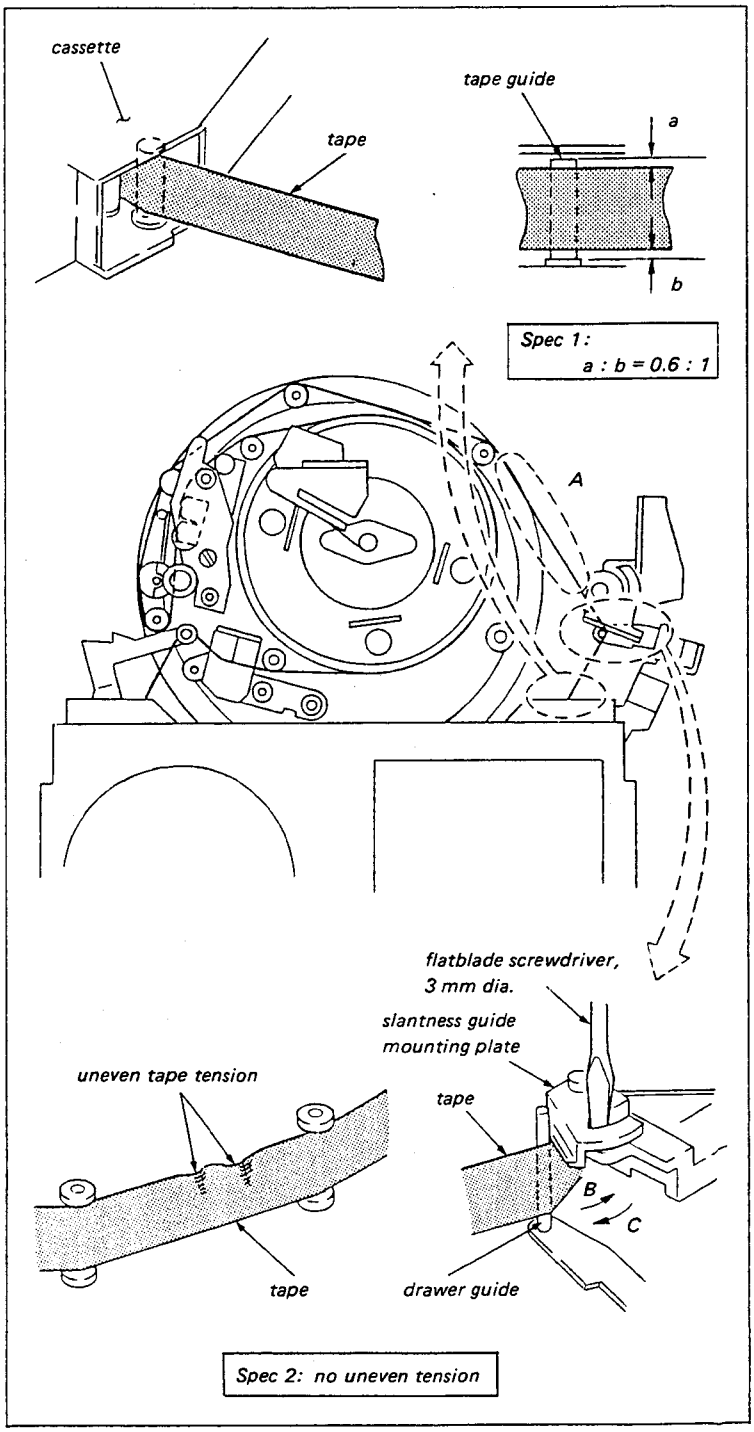
(5) Repeat 4 to 5 times steps (3) and (4), to make confirmation of this check.

**Adjustment procedure:**

(1) Adjust the position of the slantness guide mounting plate so that the required specifications are satisfied.

. When the tape runs upper on the tape guide: Move by hand the slantness guide mounting plate in the direction B.

. When the tape runs lower on the tape guide: Move with a flatblade screwdriver the slantness guide mounting plate in the direction C.



## 7-1-5. Tape Run Adjustment (REV, F.FWD and REW modes)

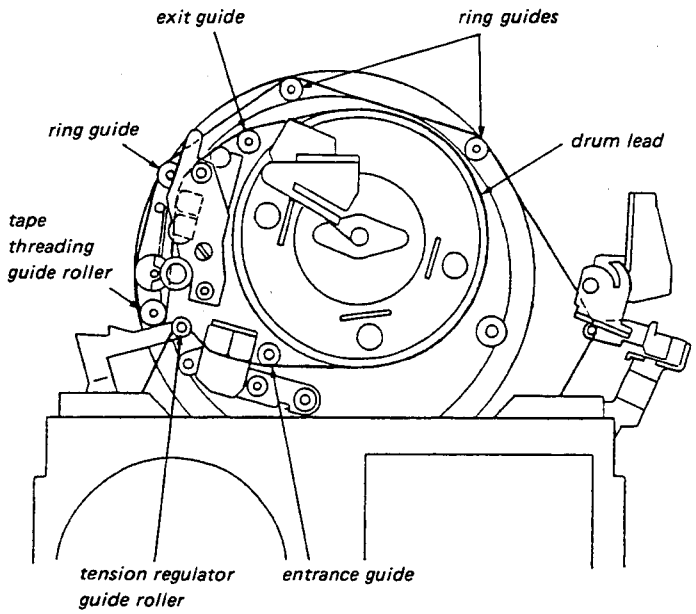
**Tool:** Locally special made cassette tapes BCT-20G and BCT-20M without a lid (Refer to the alignment information.)
Inspection mirror

**Check procedure:**

(1) Insert BCT-20G without a lid. (Never use an alignment tape.) Put the unit into the REV mode.
(2) Check by an inspection mirror that the tape curl specification at each flange of the tape threading guide, exit guide, drum lead, entrance guide and tension regulator is satisfied. (Spec. 1)
(3) Check that the tape curl specification is satisfied at each flange of all guides on the threading ring. (Spec. 2)
(4) Push the F.FWD button and put the unit into the F.FWD mode.
(5) Check by an inspection mirror that the tape curl specification at each flange of the tape threading guide, exit guide, drum lead, entrance guide and tension regulator is satisfied. (Spec. 3)
(6) Check that the tape curl specification is satisfied at each flange of all guides on the threading ring. (Spec. 4)
(7) Push the REW button, and put the unit into the REW mode.
(8) Check the step (5) again.
(9) Check the step (6) again.
(10) Insert BCT-20M without a lid. (Never use an alignment tape.) Put the unit into the REV mode.
(11) Repeat the steps (1) to (9), and make confirmation of this check.

**Adjustment procedure:**

(1) Replace the threading ring ass'y. After the replacement, Sec. 5-4 Threading Ring Rotation Adjustment and Sec. 5-5 Gear Ass'y Position Adjustment are necessary.




*Spec 1: tape curl is less than a 1/10 width of the tape*
*Spec 2: tape curl is less than a 1/6 width of the tape*
*Spec 3: tape curl is less than a 1/6 width of the tape*
*Spec 4: tape curl is less than a 1/4 width of the tape*

**.How to put the unit into REV and PLAY modes continuously.**

(i) Insert a cassette tape. Put the unit into the REC mode.
(ii) Short between the TP206/SS-31P and GND with a shorting clip, while the REC mode.
(iii) Put the unit into the REC OFF states. The unit becomes into the REV mode for about 10 sec.
(iv) Push the REC button, and put the unit into the REC mode again.
(v) Repeat the steps (iii) and (iv).

## 7-2. VIDEO TRACKING ADJUSTMENT

**Tool:** Alignment tape, CR2-1B PS
Oscilloscope
Allen wrench (across flat has 0.89 mm)
Inspection mirrror
Playback (PB) Amplifier Jig

**Preparaion:**

(1) Connect the oscilloscope to the unit.
CH-1: TP311/VA-52P
TRIG: TP30/SS-31P

(2) Disconnect the CN8/VA-52P. Connect the harness to the input connector of the PB amplifier jig.

(3) Disconnect the CN10/VA-52P. Connect the output connector of the PB amplifier jig to the CN10/VA-52P.

(4) Disconnect the 2P connector on the upper drum ass'y. Connect the 2P connector of the PB amplifier jig.

(5) Short between the TP33/SS-31P and the GND with a shorting clip.

Now the video REC head can playback the video signal in the PLAY mode.

**Check procedure:**

(1) Turn the RV17/SS-31P. Check that the envelove waveform at TP301 maintains flat while the amplitude increases and decreases.

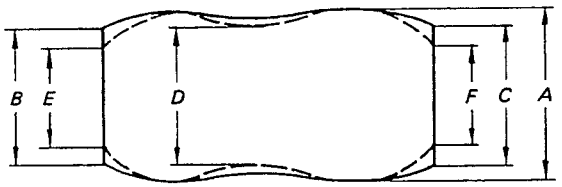
(2) Check that the RF envelope fluctuation and head-to-tape contact are within the specifications at the maximum amplitude.

**Adjustment procedure:**

. When the tracking at the drum entrance side is not satisfied.

(1) Turn the RV17/SS-31P so that the RF envelope amplitude is made to 70 to 80% of the maximum amplitude.

(2) Repeat the following steps (3) and (4) so that the tape touches to the flange of the tension regulator guide, while the RF output waveform is flat.



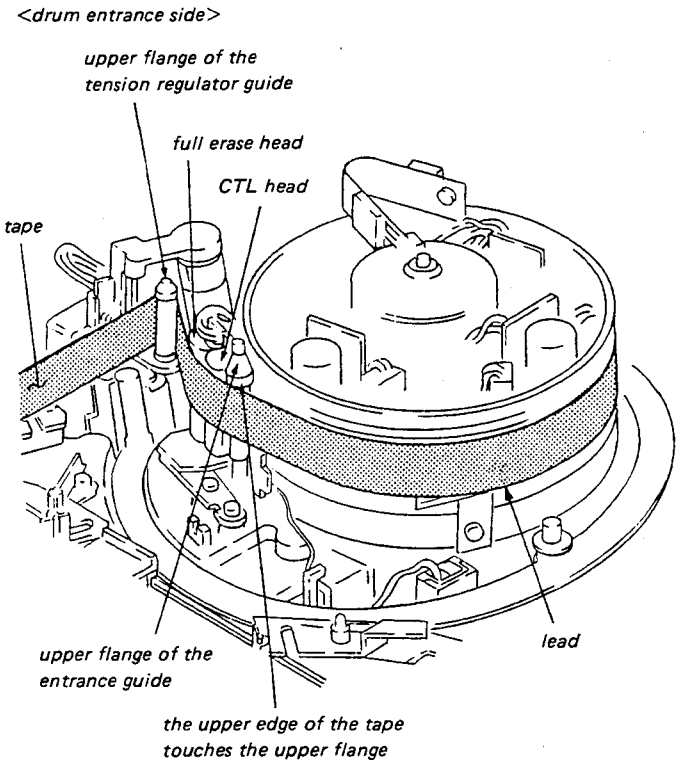

*Spec:*

*head-to-tape contact*

$\frac{B}{A} \geqq 0.8$ $\frac{C}{A} \geqq 0.8$

*fluctuation*

$\frac{D}{A} \geqq 0.9$ $\frac{E}{B} \geqq 0.9$ $\frac{F}{C} \geqq 0.9$



(3) Loosen and adjust the locking screw on the flange of the tension regulator so that the tape runs without any tape curl at the tension regulator guide.

(4) Make sure that the tape touches the upper edge of the tape and the upper flange of the entrance guide.

. When the tracking at the drum exit side is not safisfied.

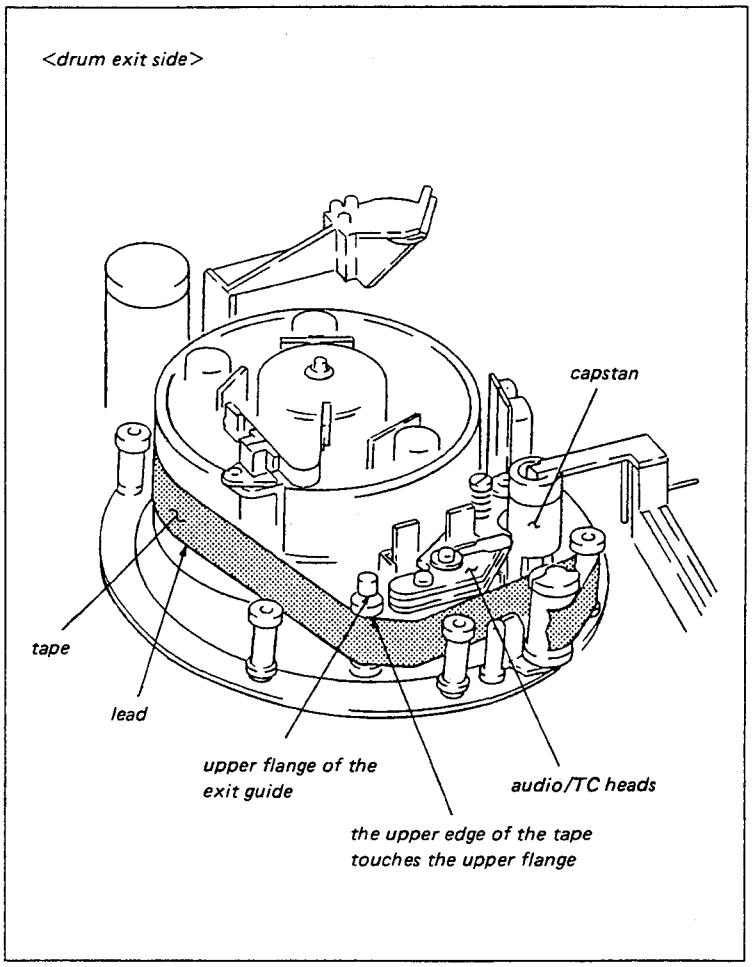
(5) Turn the RV17/SS-31P so that the RF envelope amplitude is made to 70 to 80% of the maximum amplitude.

(6) Adjust the height of the exit guide so that the tape runs in contact with the lead of the drum and RF envelope is flat simultaneously.

(7) Disconnect the shorting clip. Connect to the connectors disconnected in the preparation.

(8) After the adjustment, the following adjustments are necessary:

Sec. 7-7-1. CTL Delay Adjustment(1), Sec. 7-7-2. CTL Delay Adjustment(2), Sec. 7-4-4. CTL Head Phase Adjustment, and Sec. 7-6-1. Video REC Head Switching Position Adjustment.



## 7-3. FULL ERASE HEAD ADJUSTMENT

### 7-3-1. Full Erase (FE) Head Zenith Adjustment

**Mode:** Threading end

**Tool:** Cassette reference plate

Tension regulator slantness check jig

**Check procedure:**

(1) Put the cassette reference plate on the cassette position. Check the FE head's zenith in the direction shown in the figure, with the tension regulator slantness check jig.

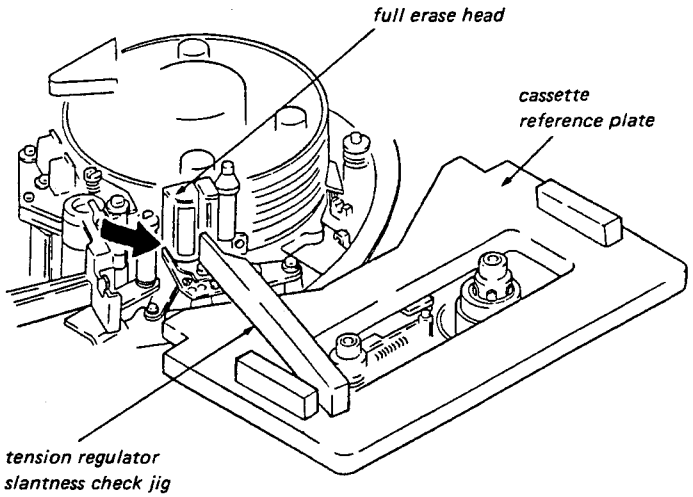
**Adjustment procedure:**

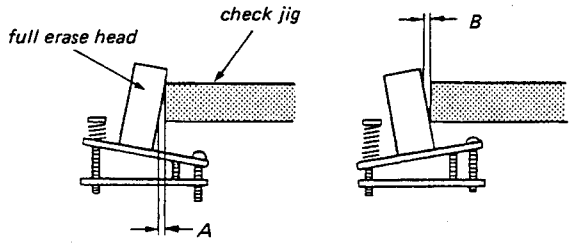
(1) Adjust the zenith adjustment screw so that it meets the specification.

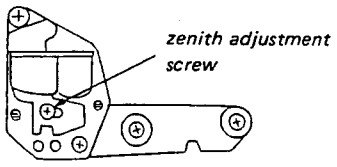
. To decrease the clearance A:
Turn it counterclockwise. The clearance decreases about 0.1mm by 1/4 turn.

. To decrease the clearance B:
Turn it clockwise. The clearance decreases about 0.1mm by 1/4 turn.

(2) After the adjustment, the following adjustment is necessary:
Sec. 7-4-1 CTL Head Zenith/
Azimuth Adjustment




*Spec: full erase head zenith: $0 \leqq A \leqq 0.05$ mm*
*: $B = 0$ mm*

### 7-3-2. Full Erase (FE) Head-to-Tape Contact Adjustment

**Mode:** PLAY - EJECT - PLAY

**Tool:** Locally special made cassette tape BCT-20G without a lid (Refer to the alignment information.)

**Check procedure:**

(1) Insert the BCT-20G cassette tape without a lid. Put the unit into the PLAY mode.

(2) Watch the FE head just from the top. Check that the portions A and B, at which the tape touches the head, meets the specification.

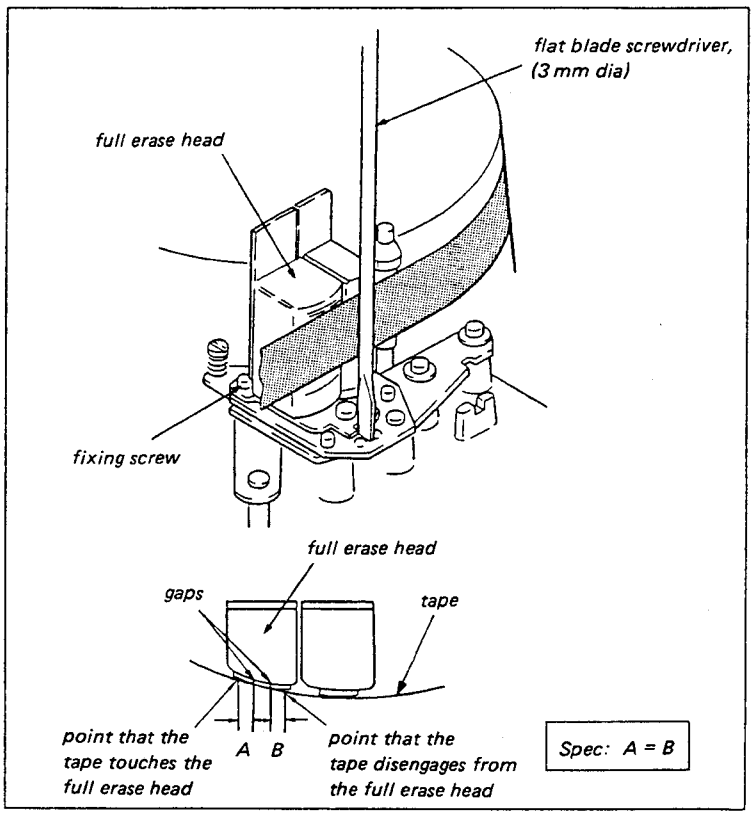
**Adjustment procedure:**

(1) Loosen the fixing screw of the FE head block by 1/3 to 1/2 turn. Be sure not to damage on the drum.

(2) Put the flatblade screwdriver, 3mm dia. and adjust the position of the FE head block as shown in the figure.

(3) Push the EJECT button and put the unit into the EJECT mode. Tighten the FE head fixing screw.

(4) Check again.



## 7-4. CTL HEAD ADJUSTMENT

### 7-4-1. CTL Head Zenith/Azimuth Adjustment

**Mode:** Thread end

**Tool:** Cassette reference plate
Tension regulator slantness check jig

**Check procedure:**

(1) Put the cassette reference plate on the cassette position.

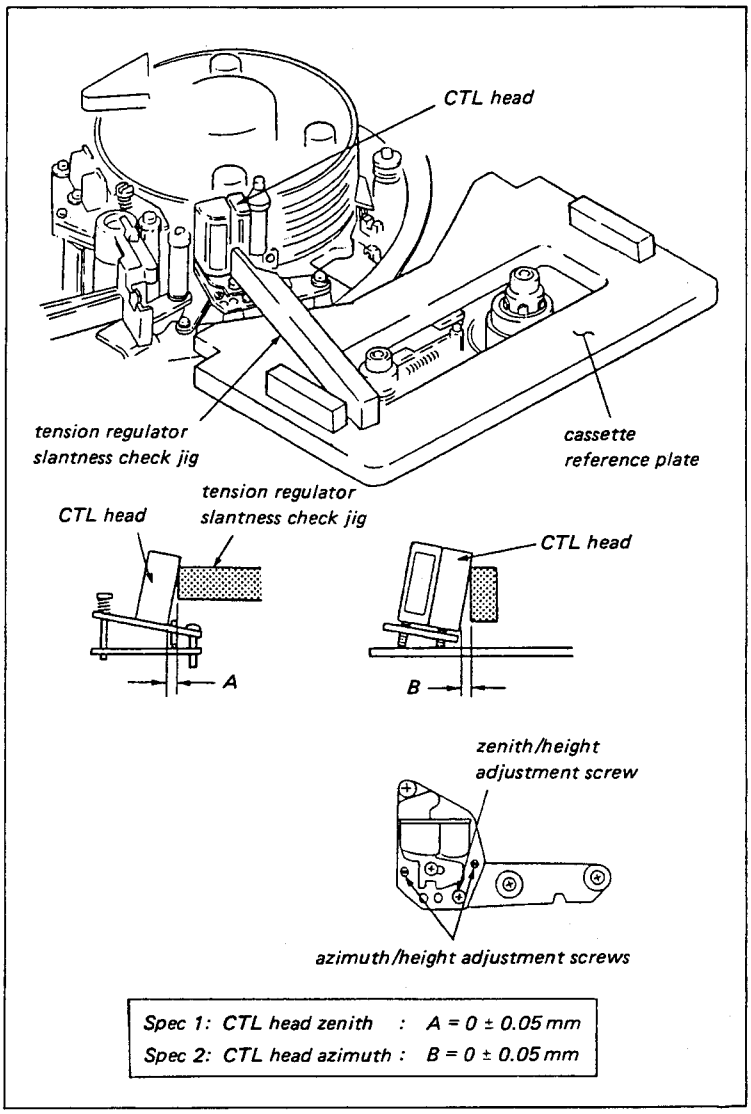
(2) Check the CTL head zenith/azimuth in the directions as shown in the figure, with the tension regulator slantness check jig.

**Adjustment procedure:**

(1) Adjust the zenith/height adjustment screw so that it meets the specification (1). Be sure not to damage on the drum.

(2) Adjust the azimuth/height adjustment screws so that it meets the specification (2).

(3) Check the specification (1) again.




*Spec 1: CTL head zenith : A = 0 ± 0.05 mm*
*Spec 2: CTL head azimuth : B = 0 ± 0.05 mm*

### 7-4-2. CTL Head Height Adjustment

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR8-1A PS
Oscilloscope

**Check procedure:**

(1) Connect the oscilloscope to:
CH-1 : TP1/SS-31P
TRIG.: TP1/SS-31P

(2) Insert the alignment tape CR8-1A PS. Playback the 1kHz segment on the CTL track.

(3) Check that the output level decreases by pressing down the tape at the arrowed portion. Check that the output level also decreases by pushing up.

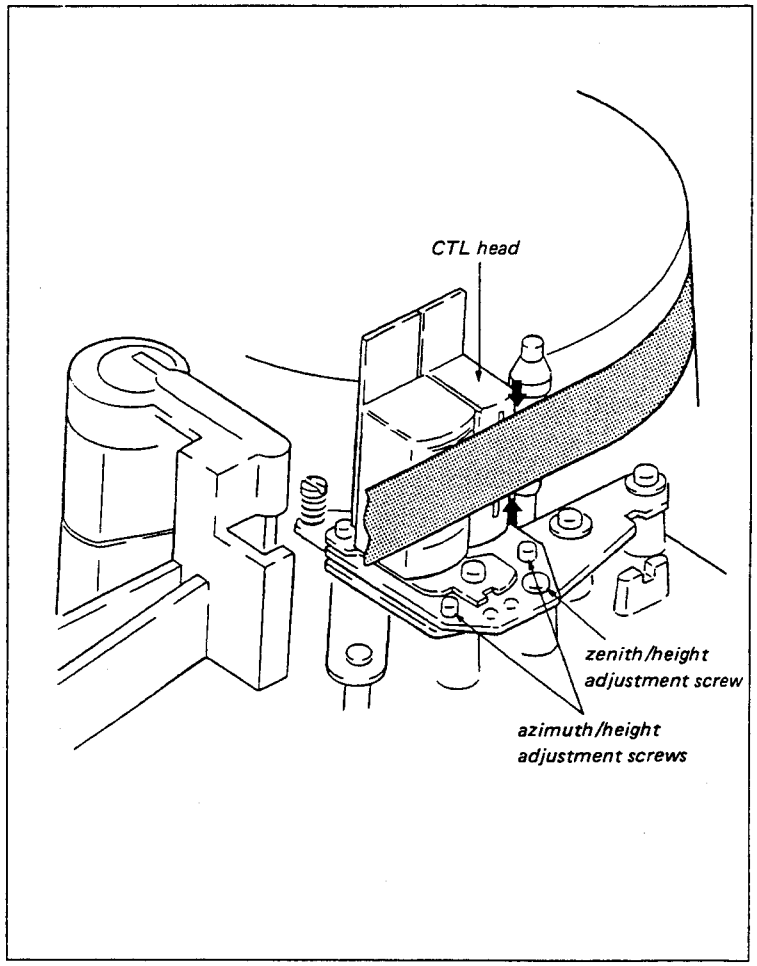
**Adjustment procedure:**

. When the output level increases while pushing up the tape at the arrowed portion.

(1) Turn the azimuth/height adjustment screws counterclockwise and the zenith/height adjustment screw clockwise, exactly equal amount to the azimuth/height adjustment screw. Adjust the output level to maximum.

. When the output level increases while pressing down the tape at the arrowed portion.

(2) Turn clockwise the azimuth/height adjustment screws and the zenith/height adjustment screw counterclockwise, exactly equal amount to the azimuth/height adjustment screw. Adjust the output level to maximum.



### 7-4-3. CTL Head Position Adjustment

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1B PS
Oscilloscope
PB (playback) amplifier jig

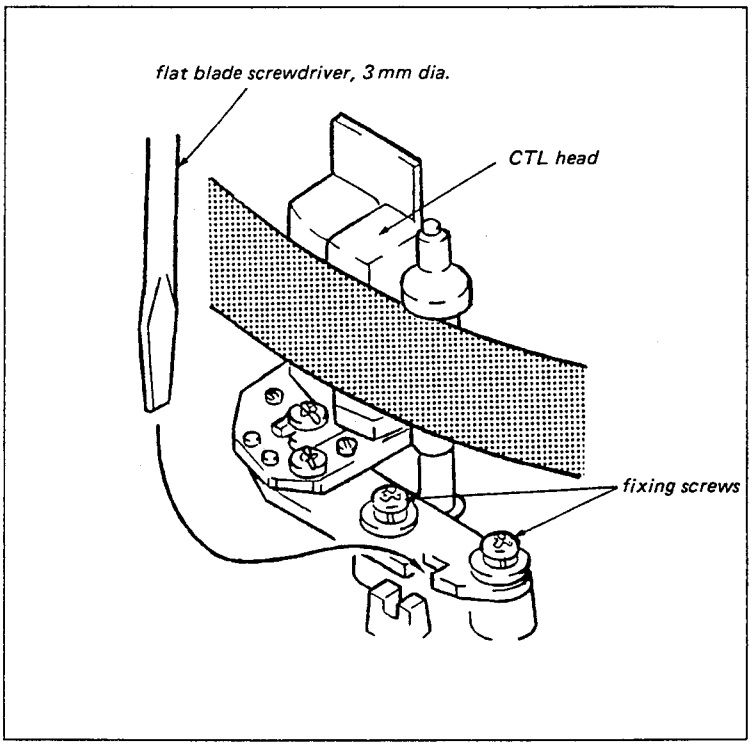
(1) Connect the oscilloscope to:
CH-1: TP311/VA-52P
CH-2: TP16/SS-31P
TRIG: TP30/SS-31P

(2) Disconnect the CN8 on the VA-52P board. Connect the CN8 to the input connector of the PB amplifier jig.

(3) Disconnect the CN10 on the VA-52P board. Connect the output connector from the jig to the CN10 on the VA-52P board.

(4) Disconnect the connector of the brush on the upper drum. Connect the 2P connector from the jig to the connector.

(5) Short between the TP33/SS-31P and the GND with a shorting clip.




**Check procedure:**

(1) Insert the alignment tape CR2-1B PS, and put the unit into the PLAY mode.

(2) Connect the VA-5P and input the composite signal to the VIDEO IN connector of the VA-5P.

(3) Check the RF level, and write down it.

(4) Short between the TP27/SS-31P and the GND with a shorting clip.

(5) Maximize the RF level by the RV17/SS-31P.

(6) If the maximum value at the step (4) is not equal to the value at the step (3), adjustment is necessary.

**Adjustment procedure:**

(1) Remove the shorting clip. Loosen the fixing screws by 1/2 to 1/4 turn. Put a flatblade screw driver to the illustrated portion, and adjust the CTL head position, where the envelop waveform at the TP311 is muximum.

(2) Remove the shorting clip.

### 7-4-4. CTL Head Phase Check

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1B PS
Oscilloscope
PB (playback) amplifier jig

**Preparation:**

(1) Connect the oscilloscope to:
CH-1: TP312/VA-52P
CH-2: TP16/SS-31P
TRIG: TP16/SS-31P

(2) Disconnect the CN8 on the VA-52P board. Connect the CN8 to the input connector of the PB amplifier jig.

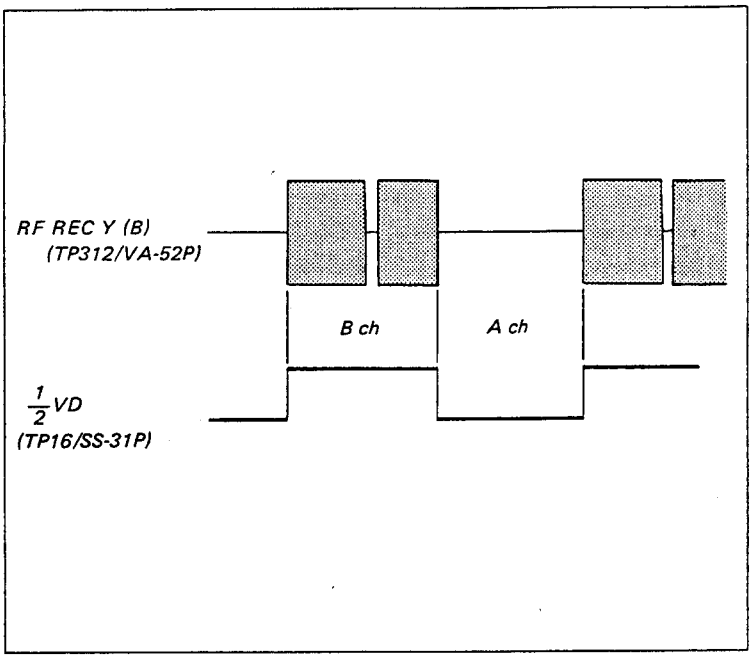
(3) Disconnect the CN10 on the VA-52P board. Connect the output connector from the jig to the CN10 on the VA-52P board.

(4) Disconnect the connector of the brush on the upper drum. Connect the 2P connector from the jig to the connector.

(5) Short between the TP33/SS-31P and the GND with a shorting clip.

**Check procedure:**

(1) Check that the relationship between two waveforms meet the specification.



## 7-5. AUDIO/TC HEAD ADJUSTMENT

### 7-5-1. Audio Head Zenith Adjustment

**Mode:** EJECT

**Tool:** Flatness plate

**Check procedure:**

(1) Put the flatness plate onto the dummy guide and the audio head. Check that the clearance between the head and the flatness plate meets the required specification. Be sure not to damage on the audio head.

**Adjustment procedure:**

. When there is a clearance at the bottom.

(1) Loosen the fixing screw about 1/4 to 1 turn.

(2) Turn the zenith/height adjustment screw (R) clockwise.

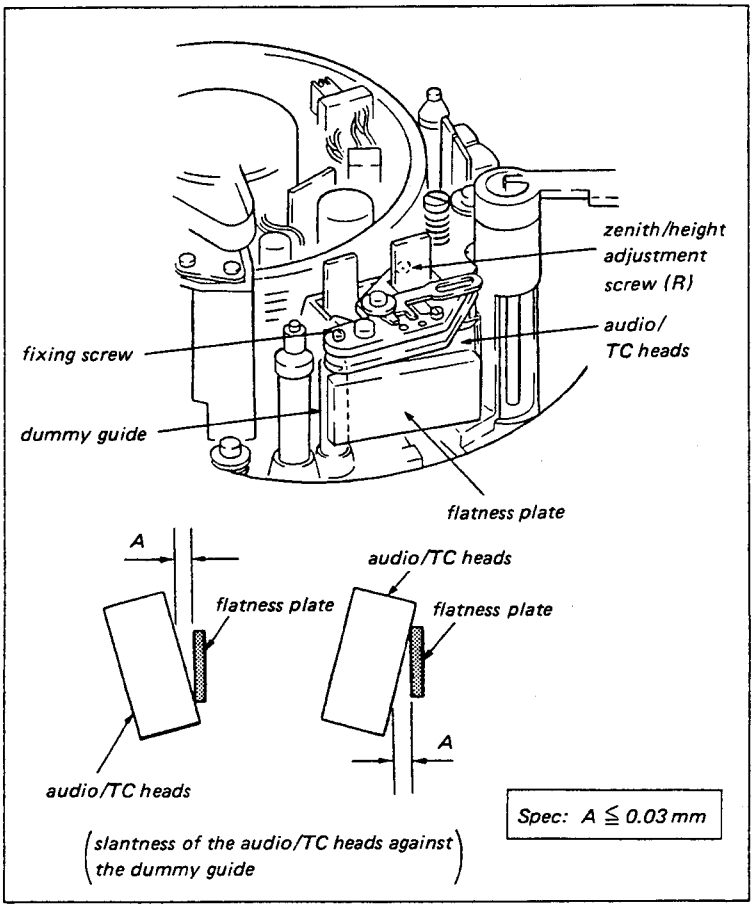
(3) Tighten the fixing screw. Check again.

. When there is a clearance at the top.

(4) Loosen the fixing screw about 1/4 to 1 turn.

(5) Turn the zenith/height adjustment screw (R) counterclockwise.

(6) Tighten the fixing screw. Check again.



### 7-5-2. Audio Head Height Adjustment

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR8-1A PS
Oscilloscope

**Check procedure:**

(1) Connect the oscilloscope to:
CH-1 : TP15/AU-72P
CH-2 : TP25/AU-72P
TRIG : TP15/AU-72P

(2) Insert the alignment tape CR8-1A PS. Play back the last segment (Audio 1kHz signal). Never play back the tape top segment (1kHz signal).

(3) Check that the output level decreases by pressing down the tape at the arrowed portion. Check that the output level also decreases by pushing up.

**Adjustment procedure:**

. When the output level increases while pushing up the tape at the arrowed portion.

(1) Loosen the fixing screw about 1 turn.

(2) Turn the zenith/height adjustment screws (R) and (F) clockwise and the azimuth/height adjustment screw counterclockwise, exactly equal amount to the zenith/height adjustment screws. Adjust the output level to maximum.

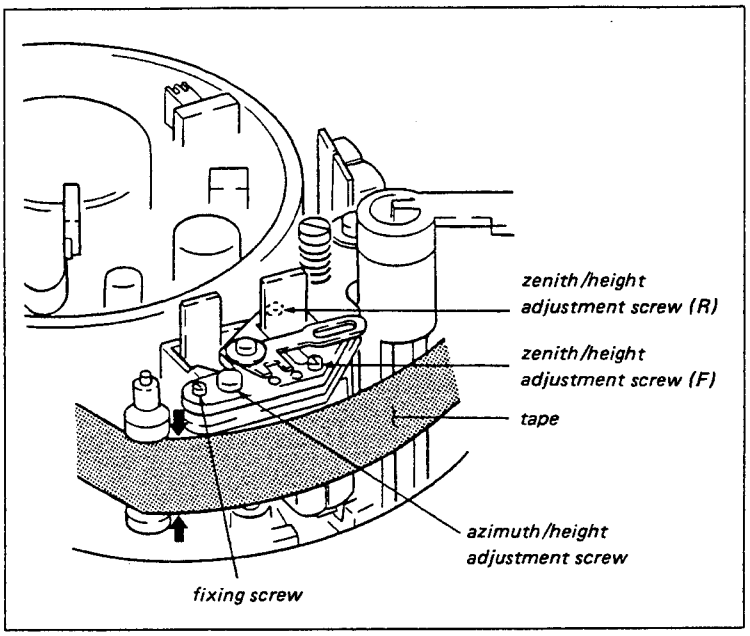
(3) Tighten the fixing screw. Check again.

. When the output level increases while pressing down the tape at the arrowed portion.

(4) Loosen the fixing screw about 1 turn.

(5) Turn the zenith/height adjustment screws (R) and (F) counterclockwise and the azimuth/height adjustment screw clockwise, exactly equal amount to the zenith/height adjustment screws. Adjust the output level to maximum.

(6) Tighten the fixing screw. Check again.



### 7-5-3. Audio Head Phase Adjustment

**Mode:** Playback the alignment tape

**Tool:** Alignment tape , CR8-1B PS
Dual trace oscilloscope

**Preparation:**

(1) Connect the dual trace oscilloscope to:
CH-1 : TP15/AU-72P
CH-2 : TP25/AU-72P

(2) Insert the alignment tape CR8-1B PS. Playback the audio 15kHz/0VU signal.

(3) Adjust the scope for horizontal and vertical amplitudes to 6cm of a lissajous waveform.

**Check procedure:**

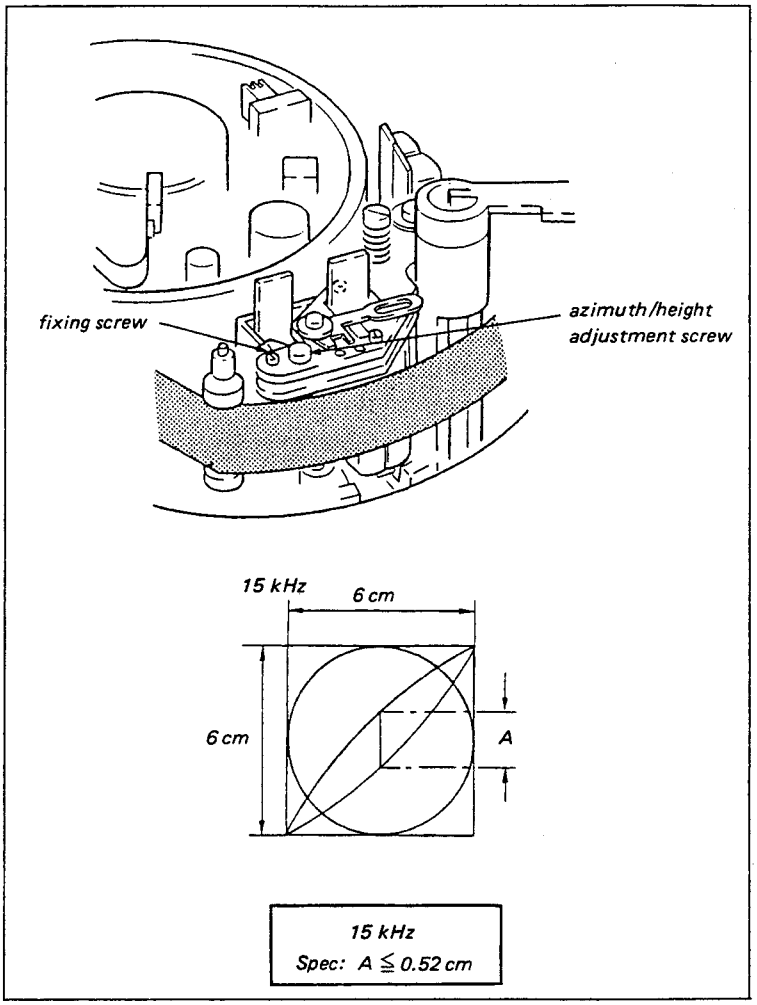
(1) Check that the vertical amplitude at the center of the horizontal direction is within the specification.

**Adjustment procedure:**

(1) Loosen the fixing screw about 1/4 to 1/2 turn.

(2) Adjust by turning the azimuth/height adjustment screw so that it meets the required specification.

(3) Tighten the fixing screw and check again.




### 7-5-4. TC Head Position Adjustment

. Before this adjustment , Sec. 7-4-3. CTL Head Position Adjustment should be completed.

**Mode:** Playback the alignment tape

**Tool:** Alignment tape CR2-1B PS
Dual trace oscilloscope

### 7-5-4. TC Head Position Adjustment

. Before this adjustment , Sec. 7-4-3. CTL Head Position Adjustment should be completed.

**Mode:** Playback the alignment tape

**Tool:** Alignment tape CR2-1B PS
Dual trace oscilloscope

**Preparation:**

(1) Connect the dual trace oscilloscope to:
CH-1 : TP1/SS-31P
CH-2 : TP8/SS-31P
TRIG.: TP1/SS-31P

(2) Insert the alignment tape CR2-1B PS, and playback it.

**Check procedure:**

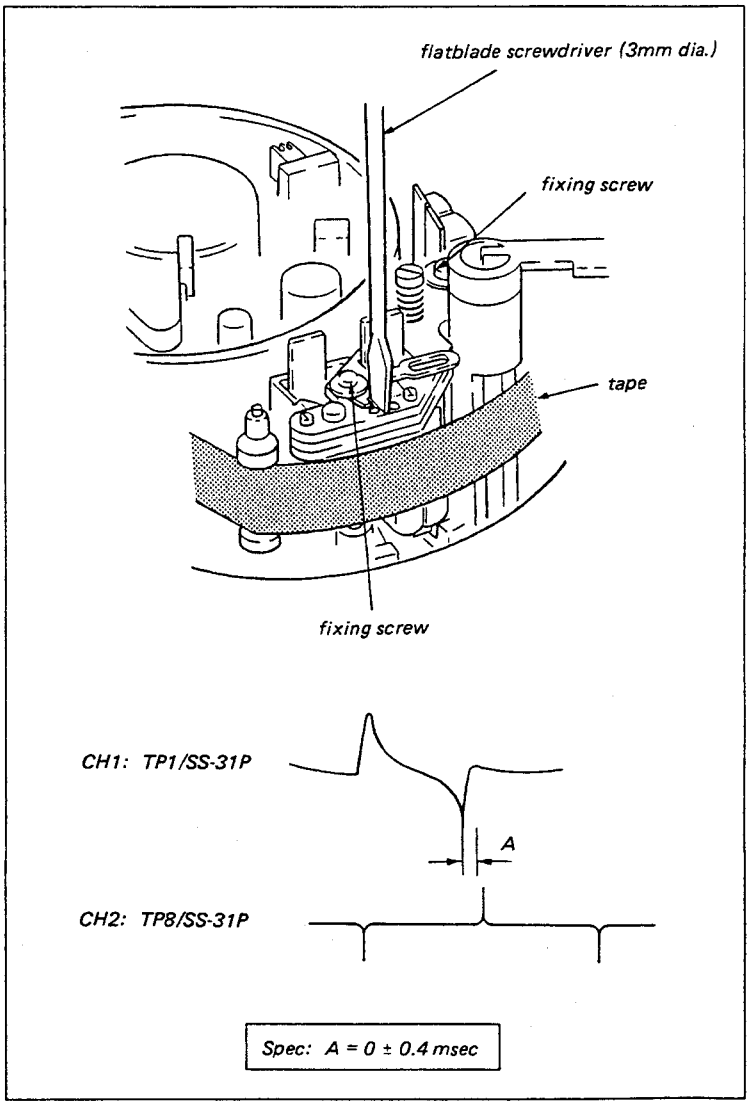
(1) Check that the waveform meets the required specification.

**Adjustment procedure:**

(1) Loosen the fixing screws about 1/4 to 1 turn.

(2) Put the flatblade screwdriver 3mm dia., as shown in the figure. Adjust the position of the TC head so that it meets the required specification.

(3) Tighten the fixing screws. Check again.



## 7-6. SWITCHING POSITION ADJUSTMENT

### 7-6-1. Video REC Head Switching Position Adjustment

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1B PS
Oscilloscope
PB amplifier jig

**Preparation:**

(1) Connect the oscilloscope to:
CH-1: TP311/VA-52P
CH-2: TP30/SS-31
TRIG: TP30/SS-31P

(2) Disconnect the CN8 on the VA-52P board. Connect the CN8 to the input connector of the PB amplifier jig.

(3) Disconnect the CN10 on the VA-52P board. Connect the output connector from the jig to the CN10 on the VA-52P board.

(4) Disconnect the connector of the brush on the upper drum. Connect the 2P connector from the jig to the connector.

(5) Short between the TP33/SS-31P and the GND with a shorting clip.

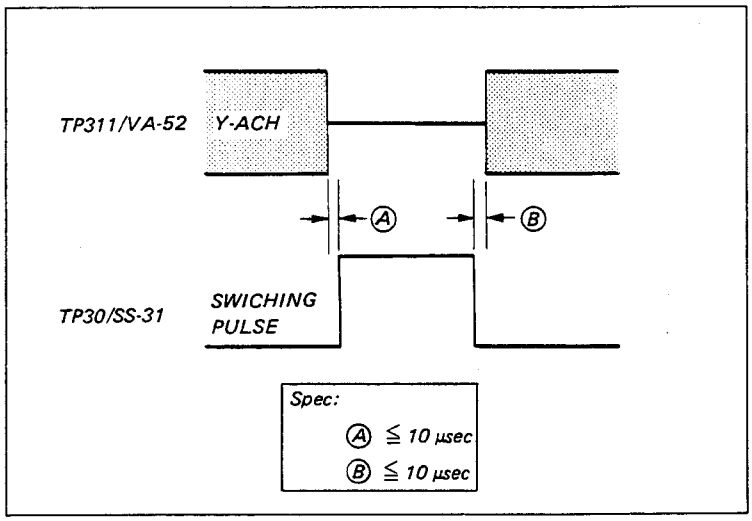
**Check procedure:**

(1) Check that the CH-A and CH-B RF envelopes meet the specification at the switching pulse position.

**Adjustment procedure:**

(1) Adjust by the RV3/SS-31P, so that the specification is satisfied.

(2) After the adjustment, remove the shorting clip.



### 7-6-2. Video PB Head Switching Position Adjustment

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1B PS
Oscilloscope

**Preparation:**

(1) Connect the Oscilloscope to:
CH-1: TP311/VA-52P
CH-2: TP30/SS-31
TRIG: TP30/SS-31P

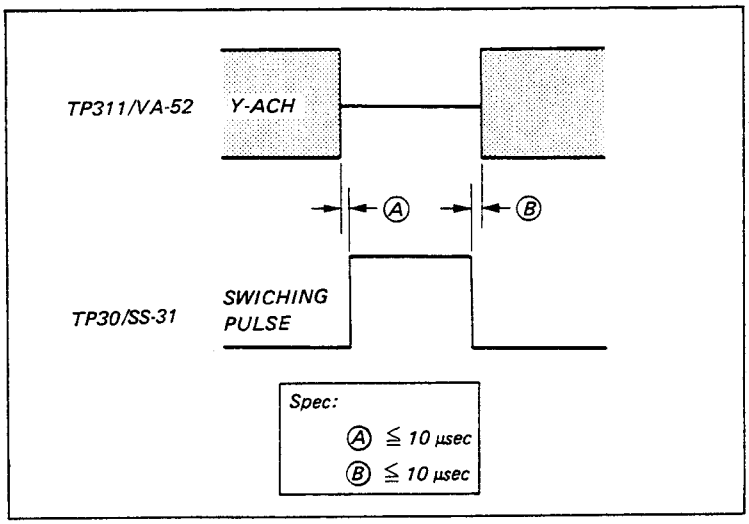
(2) Insert the alignment tape CR2-1B PS. Put the unit into the PLAY mode.

**Check procedure:**

(1) Check that the envelopes meet the specifications at the switching pulse position.

**Adjustment procedure:**

(1) Adjust by RV18/SS-31P so that it meets the required specification.



### 7-6-3. Video Confidence Head Switching Position Adjustment

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1B PS
Oscilloscope

**Preparation:**

(1) Connect the oscilloscope to:
CN-1: TP311/VA-52P
CN-2: TP30/SS-31
TRIG: TP30/SS-31P

(2) Short between the TP33/SS-31P and the GND with a shorting clip. Short between the TP35/SS-31P and the GND with a shorting clip.

(3) Insert the alignment tape, CR2-1B PS and put the unit into the PLAY mode.

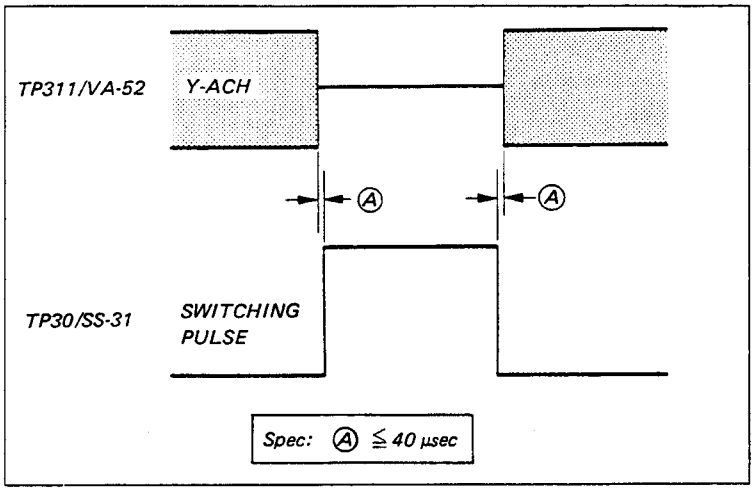
**Check procedure:**

(1) Check that the CH-A and the CH-B RF envelopes meet the specification at the switching position.

**Adjustment procedure:**

(1) Adjust by the RV16/SS-31P so that the specification is satisfied.

(2) After the adjustment, remove the shorting clips.



## 7-7. CTL DELAY ADJUSTMENT

### 7-7-1. CTL delay Adjustment (with sync)

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1PS
Oscilloscope
Component/composite adaptor VA-5P

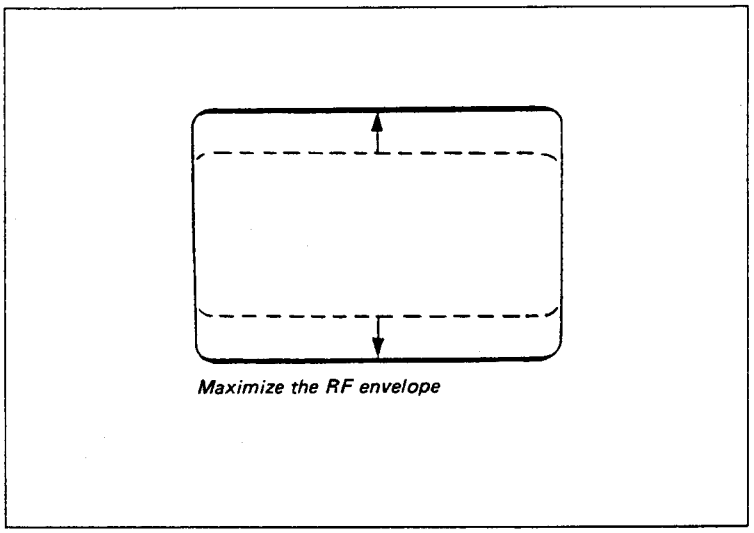
**Preparation:**

(1) Connect the VA-5P to the BVV-5PS. Input the composite video signal to the VIDEO IN connector of the VA-5P.

(2) Connect the oscilloscope to:
CH-1: TP311/VA-52P
CH-2: TP312/VA-52P
TRIG: TP30/SS-31P

**Adjustment procedure:**

(1) Maximize the envelope waveform at the TP311 by the RV19/SS-31P.



*Maximize the RF envelope*

### 7-7-2. CTL Delay Adjustment (without sync)

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR2-1PS
Oscilloscope
PB amplifier jig
Component/composite adaptor VA-5P

**Preparation:**

(1) Connect the oscilloscope to:
CH-1: TP311/VA-52P
CH-2: TP312/VA-52P
TRIG: TP30/SS-31P

(2) Disconnect the CN8 on the VA-52P board. Connect the CN8 to the input connector of the PB amplifier jig.

(3) Disconnect the CN10 on the VA-52P board. Connect the output connector from the jig to the CN10 on the VA-52P board.

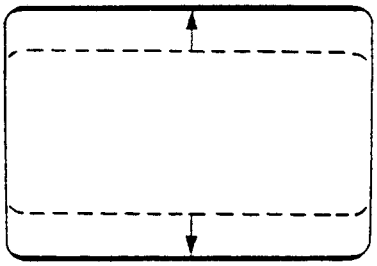
(4) Disconnect the connector of the brush on the upper drum. Connect the 2P connector from the jig to the connector.

(5) Short between the TP33/SS-31P and the GND with a shorting clip.

**Adjustment procedure:**

(1) Maximize the envelope waveform at the TP311 by the RV17/SS-31P.

(2) After the adjustment, Remove the shorting clip.



*Maximize the RF envelope*

## 7-8. VIDEO HEAD DIHEDRAL ADJUSTMENT

### 7-8-1. Video PB Head Dihedral Adjustment

. This adjustment is only for the Y head. The reference head is CH-A. (The CH-A head must not be adjusted.)

**Mode:** Playback the alignment tape

**Tool:** Alignment tape, CR5-2APS
Monitor TV
PB Adaptor, VA-500P
Dihedral adjustment screw

**Preparation:**

(1) Connect the PB adaptor, VA-500P to the unit by the PB adaptor connector (20P).

(2) Connect the monitor TV to the PB adaptor, VA-500P.

(3) Insert the alignment tape CR5-2APS. Playback the monoscope segment.

**Check procedure:**

(1) Check visually the vertical line beneath the switching point on the monitor. If the vertical line splits, adjustmet is necessary.

**Adjustment procedure:**

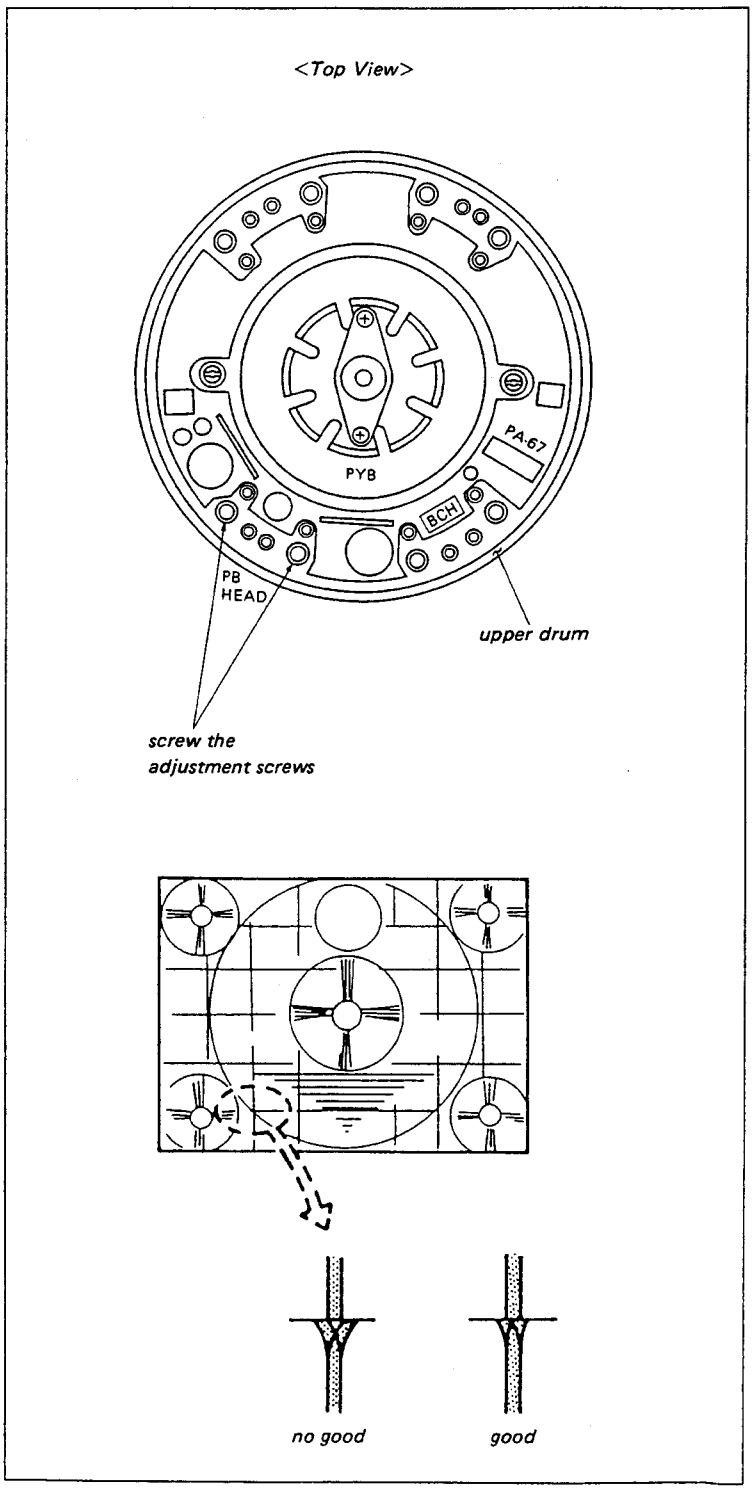
(1) Screw the adjustment screw into the adjusting hole shown in the figure, until some resistance is felt.

(2) If the adjustment screw is screwed further more, the video head is moved and the dihedral is adjusted.

(3) Playback the monoscope signal on the alignment tape. When the splits has become worse, unscrew the adjustment screw, and screw the adjustment screw on the opposite side of the video head, and adjust the dihedral.

(4) Check and adjust until the specification is satisfied.

(5) After the adjustment, remove the dihedral adjustment screws, and check again.



### 7-8-2. Video REC Head Dihedral Adjustment

. This adjustment is only for the Y head. The reference head is CH-A. (The CH-A head must not be adjusted.)
. Sec. 7-8-1. Video PB Head Adjustment should be adjusted previously.

**Mode:** REC/PLAYBACK

**Tool:** Monitor TV
PB Adaptor, VA-500P
Component/composite adaptor, VA-5P
Dihedral adjustment screw

**Preparation:**

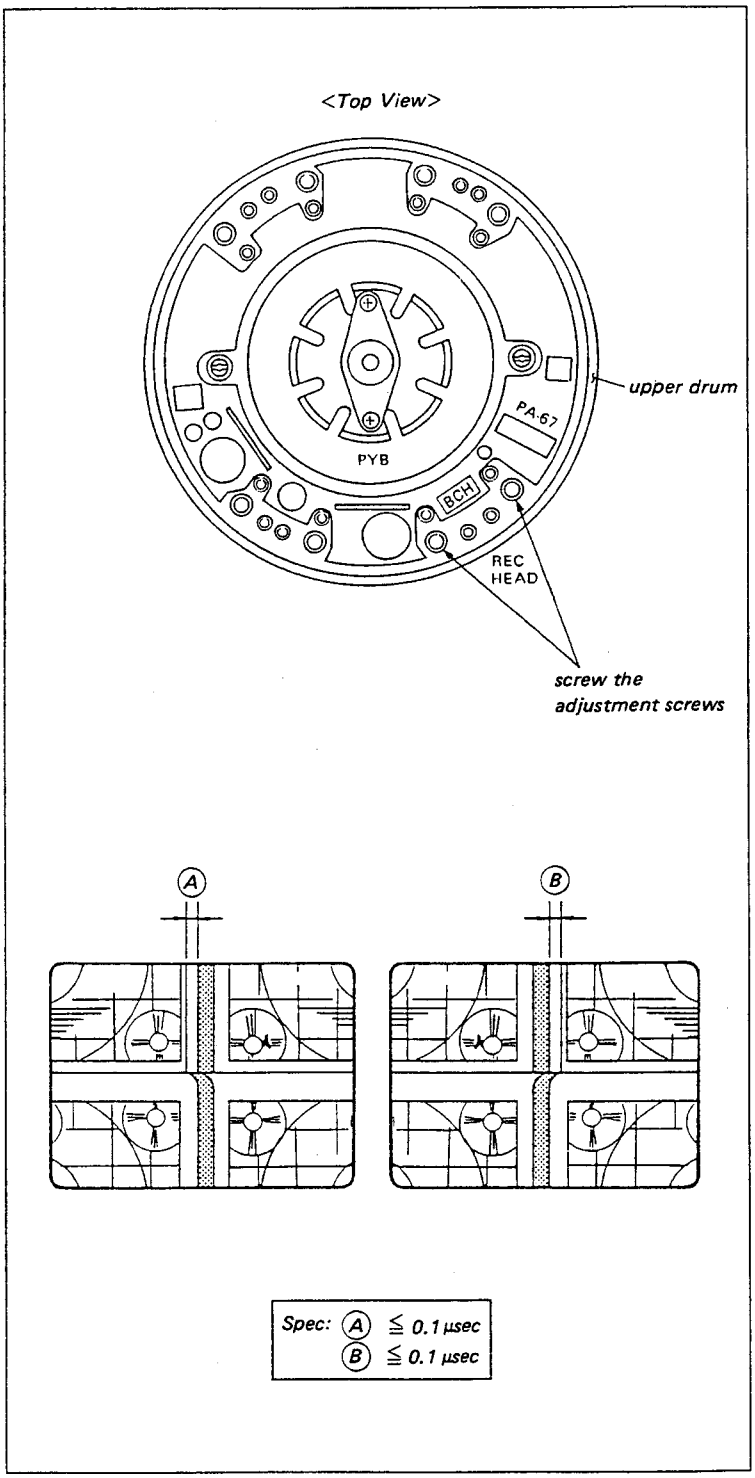
(1) Connect the PB adaptor, VA-500P to the unit by the PB adaptor connector (20P).
(2) Connect the monitor TV to the PB adaptor, VA-500P. (Refer to the alignment information.) Put the monitor TV into the pulse-cross mode.
(3) Connect the VA-5P to the unit. Input the monoscope signal to the VIDEO IN connector of the VA-5P.

**Check procedure:**

(1) Insert a BCT-20K and record the monoscope signal.
(2) Play back the recorded tape. Check visually the sync distortion on the monitor. If not, adjustmet is necessary.

**Adjustment procedure:**

(1) Screw the adjustment screw into the hole shown in the figure video head printed "PYB", until some resistance is felt.
(2) If the adjustment screw is screwed further more, the video head is moved and the dihedral is adjusted.
(3) Record and playback the monoscope signal. When the distortion has become worse, unscrew the adjustment screw, and screw the adjustment screw on the opposite side of the video head, and adjust the dihedral.
(4) After adjustment, remove the dihedral adjustment screws, and check again.



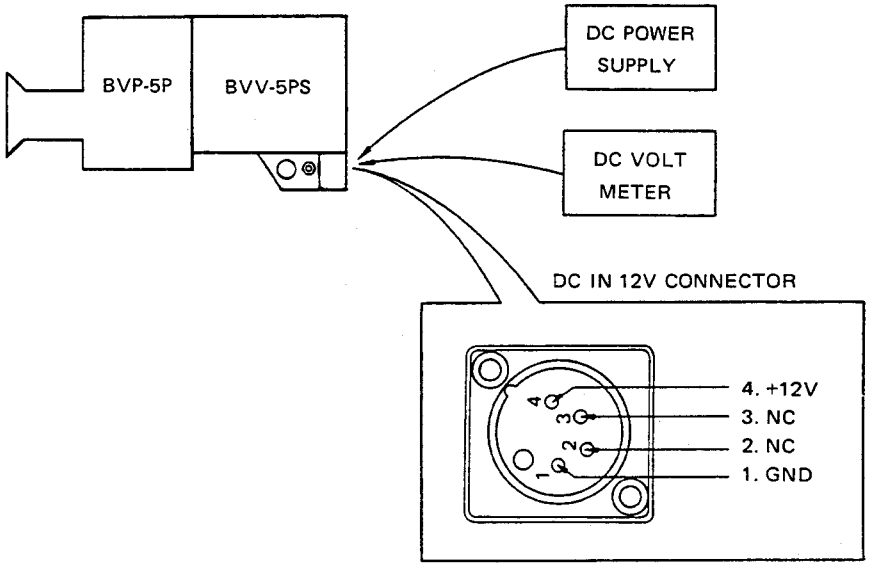
# SECTION 8
# POWER SUPPLY AND SYSTEM ALIGNMENT

[Required Equipment]

- Color video camera, BVP-5P
- DC Power Supply
- DC Volt Meter

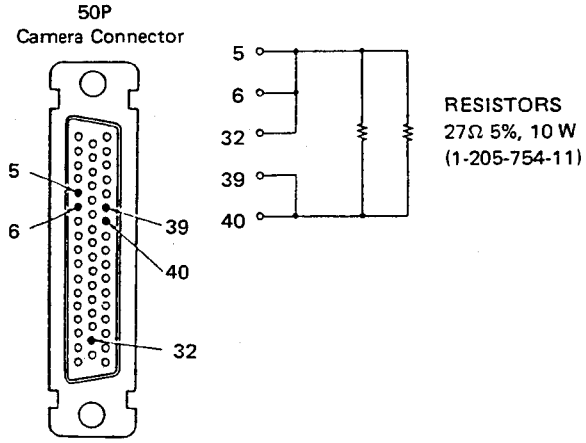
[Connection]

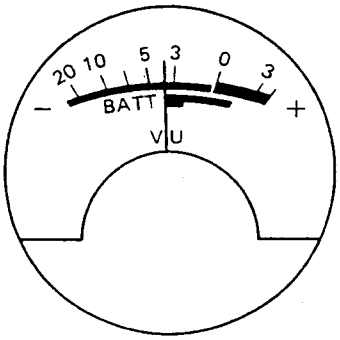
BVV-5PS does not enter the REC mode without a REF. SYNC input to the 50P connector.
Connect as shown in the figure.



## 8-1. BATTERY METER CALIBRATION ADJUSTMENT

Note: BVP-5P (color video camera) is recomended in this adjustment.
If the BVP-5P is not available, the following modification is neccessary.




| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Connect the BVP-5P to the 50P connector. (Refer to the note.)<br>• Short with a shorting clip between the E201/SS-31P (A-3 C) and the TP205/SS-31P (C-1 C)<br>• DC IN 12V connector: 11.05 ± 0.01 Vdc<br>• CAMERA : ON<br>VTR : SAVE<br>• Pressing the BATT switch, adjust the RV2/TC-39P (S-3 S) so that the specification is satisfied.<br>• After the adjustment, turn off the power and remove the shorting clip. | Level Meter<br>  <br><br>Pointer should stay at the edge of the green zone. | ◐ RV2/TC-39P (S-3 S) |

## 8-2. BATTERY END ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Connect the BVP-5P to the 50P connector.<br>• Camera: STBY mode<br>• Short with a shorting clip between the E201/SS-31P (A-3 C) and the TP205/SS-31P (C-1 C).<br>• DC IN 12 V connector: 11.05 Vdc<br>• Set the S1/SS-31P to; S1-1=OFF: S1-2=ON, S1-3=OFF<br>• Rewind completely and insert a cassette tape BCT-20G.<br>• REC mode | TP201/SS-31P (B-3 C)<br>Turn slowly the RV201 so that the duty cycle of H level and L level is 50%.<br>GND; E201/SS-31P (A-3 C) | ⊘ RV201/SS-31P (B-3 C) |
| STEP 2.<br>• Set the S1/SS-31P to; S1-1=OFF: S1-2=ON, S1-3=OFF<br>• DC IN 12 V connector: 11.78 Vdc<br>• DC IN 12 V connector: 11.68 Vdc | TP202/SS-31P (C-3 C)<br>"L" level<br>"H" level | |

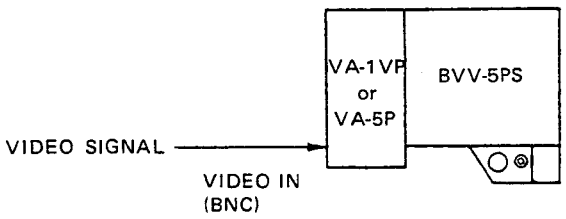
# SECTION 9
# SERVO SYSTEM ALIGNMENT

[Required Equipments]

- Component/Composite adaptor: VA-1VP/VA-5P
- Dual trace oscilloscope
- Playback (PB) Adaptor: VA-500P
- Playback (PB) amplifier jig
- Alignment tape, CR5-1B PS, CR2-1B PS, CR5-2A PS

[Connection]

BVV-5PS does not enter the REC mode without a REF. SYNC input to the 50P connector. Connect as shown in the figure.




- Alignment tape CR2-1B PS Contents

CR2-1B PS

| Contents | For use |
|---|---|
| Video, Y track; 6MHz signal<br>(track width; 86u)<br>C track; 5MHz signal<br>(track width; 73u)<br>Audio, blank<br>TC, CTL signal | .Video trackig adjustment<br>.CTL head position adjustment<br>.TC head position adjustment<br>.Switching position adjustment |

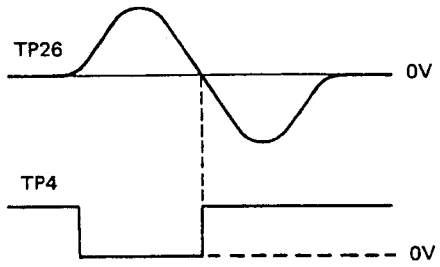
- Alignment tape CR5-2A PS Contents

| TIME min: sec | VIDEO |
|---|---|
| 0 : 00 | 75% Color Bars |
| 3 : 00 | Multi Burst<br>Y; 0.5, 1.0, 2.0, 3.0, 4.1, 4.5 MHz<br>C; 0.2, 0.5, 1.0, 1.5 MHz |
| 6 : 00 | Bowtie & 10T |
| 9 : 00 | Pulse & Bar |
| 11 : 00 | Quad Phase |
| 13 : 00 | Composite Monoscope<br>(Switching position is shifted.) |
| 15 : 00 | |

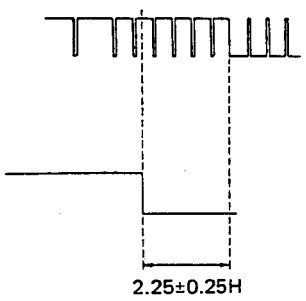
- Alignment tape CR5-1B PS Contents

| TIME min: sec | VIDEO | AFM |
|---|---|---|
| 0 : 00 | RF Sweep<br>Marker; 1, 2, 4, 6, 8, 10, 12 MHz | No-Signal |
| 2 : 00 | 60% H. Sweep (CTDM)<br>Marker; 0.5, 1, 2, 3, 4, 5 MHz | |
| 5 : 00 | Pulse & Bar (CTDM) | |
| 8 : 00 | Multi Burst<br>Y; 0.5, 1, 2, 4, 5, 5.5 MHz<br>C; 0.2, 0.5, 1, 1.5, 2 MHz | |
| 11 : 00 | Pulse & Bar | |
| 14 : 00 | 100% Color Bars | 400 Hz sine wave<br>(25 kHz deviation) |
| 16 : 30 | | (75 kHz deviation) |
| 17 : 00 | 50% Bowtie & 10T | No-Signal |
| 19 : 00 | Line 17A Signal | |
| 22 : 00 | Quad Phase | |
| 24 : 00 | Flat Field | |
| 26 : 00 | 100% Color Bars<br>(with drop out) | |
| 28 : 00 | Composite H. Sweep<br>(with VISC) | |
| 30 : 00 | | |

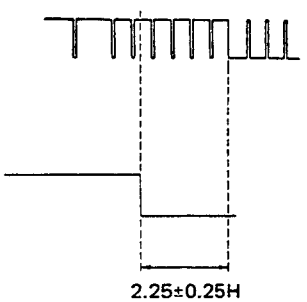
## 9-1. DRUM PG AMPLIFIER ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • STANDBY mode | TP26/SS-31P (F-6 C)<br>TP4/SS-31P (F-6 C)<br>  <br><br>TRIG: TP4/SS-31P (F-6 C) | ⊘ RV2/SS-31P (F-6 C) |

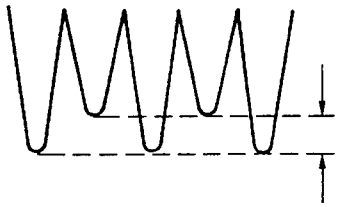
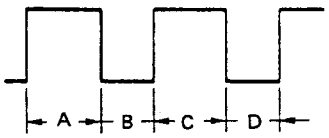
## 9-2. DRUM LOCK PHASE ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Short with a shorting clip between the TP14/SS-31P (C-6 C) and the TP15/SS-31P (D-6 C).<br>• Insert a BCT-20G and put the unit into the REC mode.<br>• After the adjustment, remove the shorting clip. | TP20/SS-31P (E-5 C)<br>TP18/SS-31P (F-6 C)<br>  <br><br>TRIG: TP18/SS-31P (F-6 C) | ⊘ RV9/SS-31P (E-7 C) |

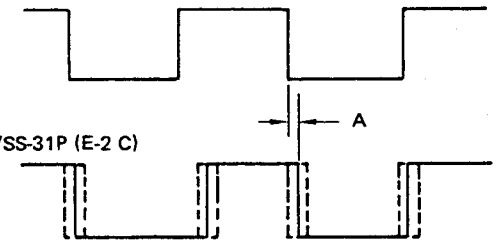
## 9-3. $\Phi^2$ (LOCKED PHASE) ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20G and put the unit into the REC mode. | TP20/SS-31P (E-5 C)<br>TP18/SS-31P (F-6 C)<br>  <br><br>TRIG: TP18/SS-31P (F-6 C) | ⊘ RV6/SS-31P (E-6 C) |

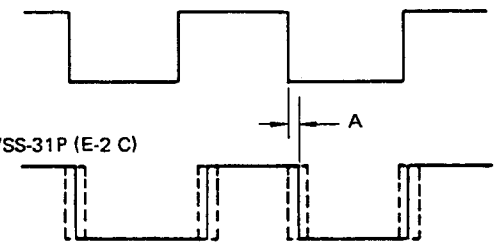
## 9-4. STOP SERVO ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Short with a shorting clip between the TP9/SS-31P (F-4 C) and the TP10/SS-31P (F-4 C).<br>• Insert a BCT-20G and put the unit into the REC mode. | TP11/SS-31P (F-5 C)<br>  <br>Minimize this. (40mV or less)<br>TRIG: TP11/SS-31P (F-5 C) | ⊘ RV11/SS-31P (F-5 C) |
| STEP 2.<br>• Short with a shorting clip between the TP9/SS-31P (F-4 C) and the TP10/SS-31P (F-4 C).<br>• Insert a BCT-20G and put the unit into the REC mode.<br>• After the adjustment, remove the shorting clip. | TP13/SS-31P (D-4 C)<br>  <br>A=C<br>$A>\frac{B}{2}$, $A>\frac{D}{2}$<br>TRIG: TP13/SS-31P (D-4 C) | ⊘ RV10/SS-31P (F-5 C) |
| STEP 3.<br>• Short with a shorting clip between the TP22/SS-31P (F-5 C) and the TP23/SS-31P (F-4 C).<br>• Short with a shorting clip between the TP37/SS-31P (F-4 C) and the E1/SS-31P (C-7 C).<br>• Insert a BCT-20G and put the unit continuously into the PLAY and STOP modes 4 to 5 times. Check that the specification is satisfied.<br>• After the adjustment, remove the shorting clips. | TP12/SS-31P (F-4 C)<br>STOP mode; $+0.6^{+0.1}_{-0}$ Vdc | ⊘ RV12/SS-31P (F-5 C) |

## 9-5. CAPSTAN LOCK PHASE ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Playback the alignment tape CR2-1B PS. | TP16/SS-31P (E-2 C)<br>  <br><br>A = 0 ± 0.1 msec.<br>(Measure at the center of the jitter.)<br>TRIG: TP16/SS-31P (E-2 C) | ⊘ RV13/SS-31P (E-4 C) |

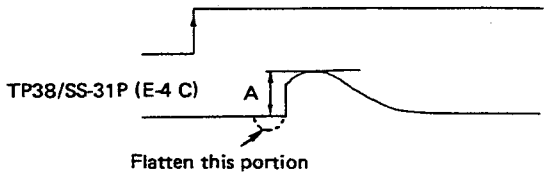
## 9-6. INSTANT START ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Playback the alignment tape CR2-1B PS.<br>• Short with a shorting clip between the TP25/SS-31P (D-4 C) and the TP14/SS-31P (C-6 C).<br>• After the adjustment, remove the shorting clip. | TP16/SS-31P (E-2 C)<br>  <br><br>A = 1.0 ± 0.1 msec.<br>(Measure at the center of the jitter.)<br>TRIG: TP16/SS-31P (E-2 C) | ⊘ RV14/SS-31P (E-4 C) |

## 9-7. $V^2$ ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Connect a frequency counter to the CH-1 OUT connector of the oscilloscope.<br>•Insert a BCT-20G and put the unit into the REC mode. | TP5/SS-31P (E-6 C)<br>Frequency counter<br>252.2 ± 0.3 Hz | ⊘ RV15/SS-31P (E-4 C) |

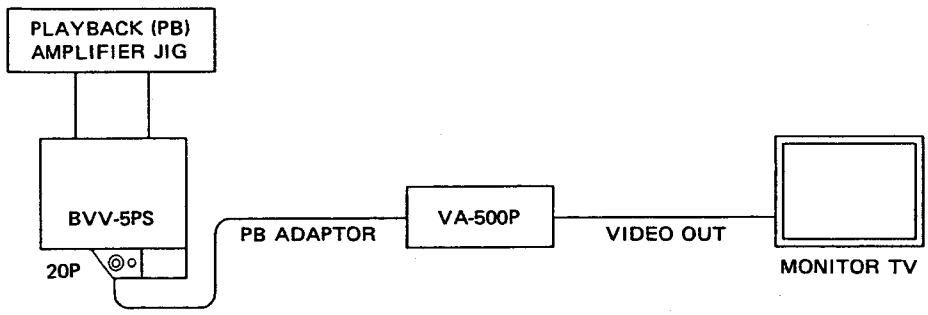
## 9-8. COMPOSITE SHOOTING ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20G and put the unit into the REC mode. | TP25/SS-31P (D-4 C)<br>  <br><br>A = 0.25±0.05 V<br>TRIG: TP25/SS-31P (D-4 C) | ⊘ RV20/SS-31P (C-6 C) |

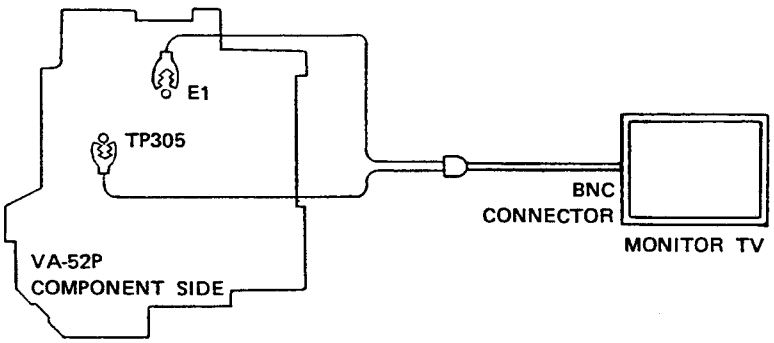
## 9-9. PICTURE SPLITTING COMPENSATOR ADJUSTMENT

Connect the Playback (PB) Amplifier Jig, VA-500P, and the monitor TV.

[Connection]

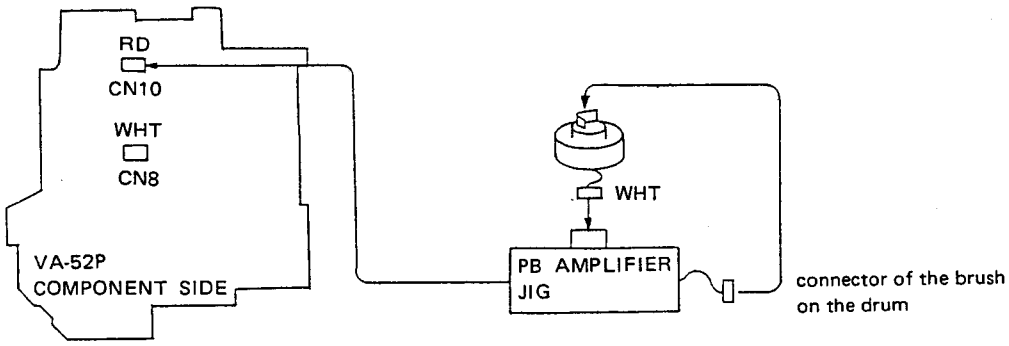


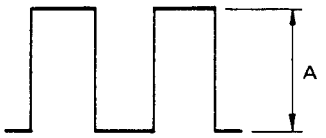
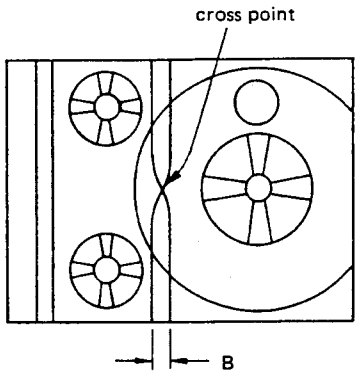

If the VA-500P cannot be available.



PB amplifier jig connection

(1) Disconnect the CN8/VA-52P. Connect the input connector of the PB amplifier jig to that.
(2) Connect the output connector from the amplifier jig to the CN10/VA-52P.
(3) Disconnect the 2P connector on the brush of the drum.
(4) Short between the TP33/SS-31P and the GND with a shorting clip. The REC head playbacks the video signal under the PLAY mode.




| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Playback the monoscope segment on the alignment tape, CR5-2A PS. | TP21/SS-31P (E-7 C)<br>  <br>spec. 1. A=0±0.1 Vp-p (almost flat)<br>TRIG; INT | ⊘ RV8/SS-31P (E-6 C) |
| • Put the monitor into the H-DELAY mode. | Monitor<br>  <br>spec. 2.<br>Minimize B. | |
| | When the specification is not satisfied, the following adjustment is necessary.<br>Step 1. Check the cross point of the vertical line.<br>Step 2. Turn clockwise the RV8 by 10° to 20°, and set the level A at the specification 1 to the 0.8Vp-p.<br>Step 3. Set the cross point of the vertical line to the position checked in the STEP 1, by turning RV7.<br>Step 4. Minimize the B at the specification 2, by turning the RV8. | ⊘ RV8/SS-31P (E-6 C)<br>⊘ RV7/SS-31P (E-6 C)<br>⊘ RV8/SS-31P (E-6 C) |

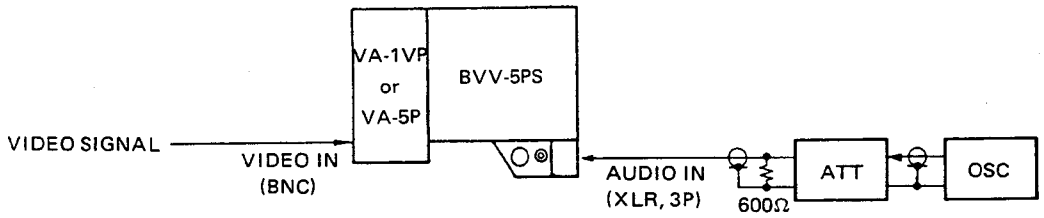
# SECTION 10
# AUDIO SYSTEM ALIGNMENT

[Required Equipment]

- Audio Oscillator
- Audio attenuator
- AC volt meter
- Alignment tape CR8-1B PS
- Spectrum analyzer

[Connection]

BVV-5PS does not enter the REC mode without a REF. SYNC input to the 50P connector. Connect as shown in the figure.




- Alignment tape CR8-1B PS Contents

| TIME min: sec | AUDIO |
|---|---|
| 0 : 00 | 1 kHz/0 VU (+0.1 dB) |
| 2 : 55 | Blank |
| 3 : 00 | 15 kHz/0 VU |
| 4 : 55 | Blank |
| 5 : 00 | 1 kHz/−20 VU (Ref.) |
| 5 : 55 | Blank |
| 6 : 00 | 40 Hz/−20 VU (+0.0 dB) |
| 6 : 25 | Blank |
| 6 : 30 | 7 kHz/−20 VU (+0.0 dB) |
| 6 : 55 | Blank |
| 7 : 00 | 10 kHz/−20 VU (−0.1 dB) |
| 7 : 25 | Blank |
| 7 : 30 | 15 kHz/−20 VU (−0.2 dB) |
| 7 : 55 | |

- Alignment tape CR5-1B PS Contents

| TIME min: sec | VIDEO | AFM |
|---|---|---|
| 0 : 00 | RF Sweep<br>Marker; 1, 2, 4, 6, 8, 10, 12 MHz | No-Signal |
| 2 : 00 | 60% H. Sweep (CTDM)<br>Marker; 0.5, 1, 2, 3, 4, 5 MHz | |
| 5 : 00 | Pulse & Bar (CTDM) | |
| 8 : 00 | Multi Burst<br>Y; 0.5, 1, 2, 4, 5, 5.5 MHz<br>C; 0.2, 0.5, 1, 1.5, 2 MHz | |
| 11 : 00 | Pulse & Bar | |
| 14 : 00 | 100% Color Bars | 400 Hz sine wave<br>(25 kHz deviation) |
| 16 : 30 | | (75 kHz deviation) |
| 17 : 00 | 50% Bowtie & 10T | No-Signal |
| 19 : 00 | Line 17A Signal | |
| 22 : 00 | Quad Phase | |
| 24 : 00 | Flat Field | |
| 26 : 00 | 100% Color Bars<br>(with drop out) | |
| 28 : 00 | Composite H. Sweep<br>(with VISC) | |
| 30 : 00 | | |

Settings of each switches on the side panel:

The followings are the standard setting for the Audio System Adjustments.
Be sure not to change the setting before specified.

MONITOR SELECT LNG AFM ⟶ AFM
CH-1/3 MIX CH-2/4 ⟶ MIX
ALARM ⟶ ON
MONITOR ⟶ EE
AUDIO SELECT CH-1 ⟶ MAN
AUDIO SELECT CH-2 ⟶ MAN
AUDIO IN CH-1 ⟶ LINE
CH-2 ⟶ LINE
CH-3 ⟶ LINE
CH-4 ⟶ LINE
DOLBY NR ⟶ OFF
AFM INPUT ⟶ CH-3/CH-4

## 10-1. MIC AMPLIFIER BALANCE ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • AUDIO IN CH-1/CH-2/CH-3/ CH-4 connector: (X Y same phase signal) | CH-1: TP101/TC-39P (D-5 C)<br>CH-2: TP201/TC-39P (C-5 C)<br>CH-3: TP301/TC-39P (B-6 C)<br>CH-4: TP401/TC-39P (B-5 C)<br><br>Minimize the level (less than –50 dBs). | CH-1:<br>⊘ RV101/TC-39P (P-2 S)<br>CH-2:<br>⊘ RV201/TC-39P (Q-2 S)<br>CH-3:<br>⊘ RV301/TC-39P (R-2 S)<br>CH-4:<br>⊘ RV401/TC-39P (S-3 S) |

## 10-2. LEVEL VOLUME REFERENCE POSITION ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • AUDIO IN CH-1/CH-2 connector: 1 kHz, +4 dBs<br><br>• EJECT mode | CH-1: TP102/TC-39P (B-4 C)<br>CH-2: TP202/TC-39P (A-3 C)<br><br>–5±0.1 dBs | Audio Level Volume<br>CH-1<br>CH-2 |
| • AUDIO IN CH-3/CH-4 connector: 1 kHz, +4 dBs | CH-3: TP302/TC-39P (B-5 C)<br>CH-4: TP402/TC-39P (B-5 C)<br><br>–17.0±0.1 dBs | Audio Level Volume<br>CH-3<br>CH-4 |

After this adjustment is completed, they are set to the audio level control volume reference position.
Be sure not to change their position until all the audio system adjustments are satisfied.

## 10-3. 50P OUTPUT LEVEL ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • AUDIO IN CH-1 connector: 1 kHz, +4 dBs<br><br>• EJECT mode | TP2/TC-39P (C-4 C)<br><br>–15.0±0.1 dBs | ⊘ RV1 on the IC12/TC-39P (G-4 C) |

## 10-4. PEAK DISPLAY ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• AUDIO IN CH-1/CH-2 connector: 1 kHz, +10 dBs | CH-1 PEAK (D6/TC39P)<br>CH-2 PEAK (D7/TC-39P)<br>CH-1 Peak lights.<br>CH-2 Peak lights. | CH-1:<br>⊘ RV102/TC-39P (Q-6 S)<br>CH-2:<br>⊘ RV202/TC-39P (Q-5 S) |
| STEP 2.<br>• AUDIO IN CH-1/CH-2 connector: 1 kHz, +9 dBs | CH-1 peak is turned off.<br>CH-2 peak is turned off. | |

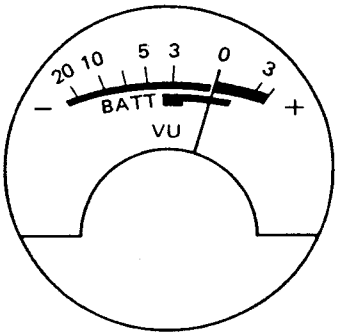
## 10-5. LIMITER ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • AUDIO IN CH-1/CH-2/CH-3/ CH-4 connector: MIC<br>• EJECT mode.<br>• AUDIO IN CH-1/CH-2/CH-3/ CH-4 connector: 1 kHz, −30 dBs | CH-1: TP102/TC-39P (B-4 C)<br>CH-2: TP202/TC-39P (A-3 C)<br>+6.0±0.2 dBs | CH-1:<br>⊘ RV2 on the IC12/TC-39P (Q-4 S)<br>CH-2:<br>⊘ RV3 on the IC12/TC-39P (Q-4 S) |
| • AUDIO IN CH-1/CH-2/CH-3/ CH-4 connector: 400 Hz, − 30 dBm | CH-3: TP302/TC-39P (A-3 C)<br>CH-4: TP402/TC-39P (A-2 C)<br>+10±0.2 dBs | CH-3:<br>⊘ RV302/TC-39P (R-6 S)<br>CH-4:<br>⊘ RV402/TC-39P (S-6 S) |

## 10-6. DOLBY INPUT LEVEL ADJUSTMENT

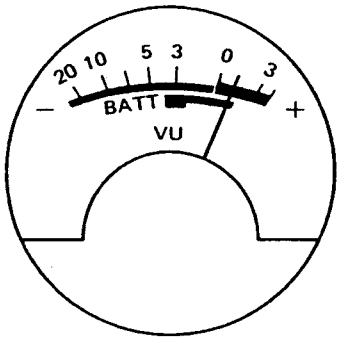
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • AUDIO IN CH-1/CH-2 connector: 1 kHz, +4 dBs<br>• EJECT mode | CH-1: TP613/VA-52P (B-1 C)<br>CH-2: TP614/VA-52P (A-1 C)<br>−10.0±0.1 dBs | CH-1:<br>⊘ RV610/VA-52P (A-3 C)<br>CH-2:<br>⊘ RV611/VA-52P (A-2 C) |

## 10-7. AUDIO LEVEL METER CALIBRATION ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • AUDIO IN CH-1/CH-2 connector: 1 kHz, +4 dBs<br>• EJECT mode | Audio level meter CH-1/CH-3, CH-2/CH-4<br>Level meter<br>  <br><br>The pointer should be just at the "0". | CH-1/CH-3:<br>⊘ RV1 on the IC607/VA-52P (C-3 C)<br>CH-2/CH-4:<br>⊘ RV2 on the IC607/VA-52P (C-3 C) |

## 10-8. AUDIO CONFI PB LEVEL ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• MONITOR SELECT CH-1/3 MIX CH-2/4: CH-1/3<br>• MONITOR: PB<br>• Insert the alignment tape CR8-1B PS and put the unit into the STOP mode.<br>• AUDIO IN CH-1/CH-2 connector: 1 kHz, +4 dBs | TP617/VA-52P (C-1 C)<br>Check and write down the level. | |
| STEP 2.<br>• Playback the audio 1 kHz signal on the alignment tape CR8-1B PS at the tape top segment. | TP617/VA-52P (C-1 C)<br>(Measuring level at Step 1) +1 dB | ⊘ RV614/VA-52P (B-2 C) |
| STEP 3.<br>• MONITOR SELECT CH-1/3 MIX CH-2/4: CH-2/4<br>• MONITOR: PB<br>• Insert the alignment tape CR8-1B PS and put the unit into the STOP mode. | TP617/VA-52P (C-1 C)<br>Check and write down the level. | |
| STEP 4.<br>• Playback the audio 1 kHz signal on the alignment tape CR8-1B PS at the tape top segment. | TP617/VA-52P (C-1 C)<br>(Measuring leve at Step 3) +1 dB | ⊘ RV613/VA-52P (B-2 C) |

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 5.<br>• Check the pointer of the VU meter.<br><br>• If the specification is not satisfied, repeat the STEP 1 to 4, and adjust it. | Audio level meter CH-1/CH-3, CH-2/CH-4<br><br>Level meter<br>  <br><br>The pointer should be between 0 and +3. | |

## 10-9. CONFI CANCEL ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M and put the unit into the REC mode.<br><br>• MONITOR SELECT CH-1/3 MIX CH-2/4: CH-1/3<br><br>• MONITOR: PB<br><br>• AUDIO IN CH-1/CH-2/CH-3/CH-4 connector: no signal<br><br>• Turn RV616/VA-52P (C-1 C) fully clockwise. | TP617/VA-52P (C-1 C)<br><br>minimize the noise.<br>(less than –35 dBs) | ⊘ RV615/VA-52P (C-1 C)<br><br>⊘ RV616/VA-52P (C-1 C) |

## 10-10. WARNING LEVEL ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20G and put the unit into the F. FWD mode till near the tape end. Put the unit into REC mode (Tape end alarm sounds.) | TP617/VA-52P (C-1 C)<br><br>ALARM SW: ON<br>–16 ± 2 dBs<br>ALARM SW: OFF<br>Less than –40 dBs | ⊘ RV612/VA-52P (B-4 C) |

## 10-11. DOLBY FILTER ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• DOLBY switch: ON<br>• EJECT mode<br>• Connect the 1 kHz, −28 dBs signal to TP611/VA-52P (A-2 C). | TP619/VA-52P (B-1 C)<br>0 dB | AC volt meter |
| STEP 2.<br>• Change the frequency to 17 kHz, −28 dBs. | TP619/VA-52P (B-1 C)<br>−8.3±0.1 dB | ⊘ FL607/VA-52P (B-2 C) |
| STEP 3.<br>• Connect the 1 kHz, −28 dBs signal to TP612/VA-52P (A-2 C). | TP620/VA-52P (A-2 C)<br>0 dB | AC volt meter |
| STEP 4.<br>• Change the frequency to 17 kHz, −28 dBs. | TP620/VA-52P (A-2 C)<br>−8.3±0.1 dB | ⊘ FL608/VA-52P (A-2 C) |

## 10-12. AUDIO PLAYBACK AMPLIFIER FREQUENCY RESPONSE ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert the alignment tape CR8-1B PS. Playback the audio signal 1 kHz (reference), 40 Hz, 7 kHz, 10 kHz and 15 kHz portion on the alignment tape.<br><br><CH-1 side><br>When the RV108/AU-72P (E-2 C) is set to the fully clockwise, and the specifications at the 10 kHz and the 15 kHz are at their lowest limit.<br><br>• Turn on the bit 1 of the S1/AU-72P (E-1 C). Adjust the RV108/AU-72P (E-2 C) again.<br><br>If the specification is not satisfied yet after turning on the bit 1 of the S1/AU-72P (E-1 C).<br>• Turn on the bit 2 of the S1/AU-72P (E-1 C) too. Adjust the RV108/AU-72P (D-2 C) again.<br><br>•If not, turn on bit 3.<br><br><CH-2 side><br>When the RV208/AU-72P (E-2 C) is set to the fully clockwise, and the specifications at the 10 kHz and the 15 kHz are at their lowest limit.<br><br>• Turn on the bit 1 of the S2/AU-72P (E-1 C). Adjust the RV208/AU-72P (E-2 C) again.<br><br>If the specification is not satisfied yet after turning on the bit 1 of the S2/AU-72P (E-1 C).<br>• Turn on the bit 2 of the S2/AU-72P (E-1 C) too. Adjust the RV208/AU-72P (E-2 C) again.<br><br>• If not, turn on bit 3. | CH-1: TP15/AU-72P (E-3 C)<br>CH-2: TP25/AU-72P (E-3 C)<br><br>Frequency / Level<br>40 Hz: Reference±2.7 dB<br>1 kHz: Reference<br>7 kHz: Reference±0.3 dB<br>10 kHz: Reference±0.5 dB<br>15 kHz: Reference±0.7 dB | Middle range of the frequency response;<br>CH-1:<br>⊘ RV109/AU-72P (E-2 C)<br>CH-2:<br>⊘ RV209/AU-72P (F-2 C)<br><br>High range of the frequency response;<br>CH-1:<br>⊘ RV108/AU-72P (C-2 C)<br>CH-2:<br>⊘ RV208/AU-72P (E-2 C) |

## 10-13. EE REFERENCE LEVEL ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • AUDIO IN CH-1/CH-2 connector: 1 kHz, +4 dBs<br>• EJECT mode | CH-1: TP15/AU-72P (E-3 C)<br>CH-2: TP25/AU-72P (E-3 C)<br>−10±0.1 dBs | CH-1:<br>⊘ RV111/AU-72P (E-3 C)<br>CH-2:<br>⊘ RV211/AU-72P (F-3 C) |

## 10-14. AUDIO PLAYBACK AMPLIFIER REFERENCE LEVEL ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Playback the audio 1 kHz signal on the alignment tape CR8-1B PS at the tape top segment. | CH-1: TP15/AU-72P (E-3 C)<br>CH-2: TP25/AU-72P (E-3 C)<br>load: open<br>−10 ± 0.1 dBs | CH-1:<br>⊘ RV110/AU-72P (E-2 C)<br>CH-2:<br>⊘ RV210/AU-72P (F-3 C) |

## 10-15. BIAS TRAP ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • AUDIO CH-1/CH-2/CH-3/CH-4 connector: No signal<br>• Turn fully counterclockwise the RV107/AU-72P (E-1 C) and RV207/AU-72P (D-1 C), and return 30 degrees to clockwise direction.<br>• Insert a BCT-20M and put the unit into the REC mode. | CH-1: TP12/AU-72P (D-1 C)<br>CH-2: TP22/AU-72P (D-1 C)<br>Minimize the signal level (Minimize the bias leak). Be sure not to set the LV5 and 6/AU-72P both to the fully clockwise nor fully counterclockwise. | CH-1:<br>⊘ LV5/AU-72P (D-1 C)<br>CH-2:<br>⊘ LV6/AU-72P (D-1 C) |

## 10-16. BIAS ADJUSTMENT (1)

Adjustment for CH-1 and that for CH-2 should be performed at the same time.

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1<br>• AUDIO IN CH-1 connector: No signal<br>• Insert a BCT-20G and put the unit into the REC mode.<br>• Turn fully counterclockwise the RV107/AU-72P (D-1 C), and return 30 degrees to clockwise direction. | CH-1: TP13/AU-72P (E-1 C)<br>GND: TP14/AU-72P (E-1 C)<br>Check and write down the level (mV). | |
| STEP 2.<br>• AUDIO IN CH-2 connector: No signal<br>• Insert a BCT-20G and put the unit into the REC mode.<br>• Turn fully counterclockwise the RV207/AU-72P (D-1 C), and return 30 degrees to clockwise direction. | CH-2: TP23/AU-72P (E-1 C)<br>GND: TP24/AU-72P (E-1 C)<br>Check and write down the level (mV). | |
| STEP 3.<br>• AUDIO IN CH-1/CH-2 connector: No signal<br>• Insert a BCT-20G and put the unit into the REC mode.<br>• Adjust to 12m Vrms the CH which has the lower level between step 1 and step 2. | CH-1: TP13/AU-72P (E-1 C)<br>CH-2: TP23/AU-72P (E-1 C)<br>12±0.2 mVrms<br>GND: TP14/AU-72P (E-1 C)<br>GND: TP24/AU-72P (E-1 C) | CH-1/CH-2:<br>RV2/AU-72P (F-1 C) |
| STEP 4.<br>• AUDIO IN CH-1/CH-2 connector: No signal<br>• Insert a BCT-20G and put the unit into the REC mode.<br>• Adjust to 12m Vrms the CH that has not adjusted at step 3. | CH-1: TP13/AU-72P (E-1 C)<br>CH-2: TP23/AU-72P (E-1 C)<br>12±0.2 mVrms<br>GND: TP14/AU-72P (E-1 C)<br>GND: TP24/AU-72P (E-1 C) | CH-1:<br>RV107/AU-72P (E-1 C)<br>CH-2:<br>RV207/AU-72P (D-1 C) |

## 10-17. BIAS ADJUSTMENT (2)

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• AUDIO IN CH-1 connector: No signal<br>• Insert a BCT-20M and put the unit into the REC mode. | CH-1: TP13/AU-72P (E-1 C)<br>15±0.5 mVrms | ⊘RV1/AU-72P (G-1 C) |
| STEP 2.<br>• AUDIO IN CH-2 connector: No signal<br>• Insert a BCT-20M and put the unit into the REC mode. | CH-2: TP23/AU-72P (E-1 C)<br>15±0.5 mVrms<br>When the specification is not satisfied, re-adjust the step 1 again.<br>Repeat steps 1 and 2 until it meets the required specification. | |

## 10-18. ERASE CURRENT FREQUENCY LEVEL ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M and put the unit into the REC mode. | TP4/AU-72P (G-3 C)<br>310±10 mVrms | ⊘ RV6/AU-72P (F-2 C) |

## 10-19. OA FREQUENCY RESPONSE ADJUSTMENT (OXIDE)

Sec. 10-2. Level Volume Reference Position Adjustment should be completed.

<table>
<tr><th>Conditions for adjustment</th><th>Specifications</th><th>Adjustment</th></tr>
<tr>
<td>• AUDIO IN CH-1/CH-2 connector:<br>40 Hz, – 16 dBs<br>1 kHz, – 16 dBs<br>7 kHz, – 16 dBs<br>10 kHz, – 16 dBs<br>15 kHz, – 16 dBs<br><br>• Insert a BCT-20G and put the unit into the REC mode.<br><br>• Playback the recorded tape using the BVW-75P (or equivalent).</td>
<td>AUDIO OUT CH-1/CH-2 connector/BVW-75P (or equivalent)<br><br>
<table>
<tr><th>Frequency</th><th>Level</th></tr>
<tr><td>40 Hz</td><td>Reference ± 3.0 dB</td></tr>
<tr><td>1 kHz</td><td>Reference</td></tr>
<tr><td>7 kHz</td><td>Reference ± 0.5 dB</td></tr>
<tr><td>10 kHz</td><td>Reference ± 0.5 dB</td></tr>
<tr><td>15 kHz</td><td>Reference ± 0.5 dB</td></tr>
</table>
</td>
<td>When the high frequency component is low:<br>Turn counterclockwise the RV102/AU-72P (B-3 C) to adjust CH-1.<br>If not to meet by RV102, adjust by LV1/AU-72P (B-2 C).<br>Turn counterclockwise the RV202/AU-72P (B-1 C) to adjust CH-2.<br>If not to meet by RV202, adjust by LV2/AU-72P (B-1 C).<br><br>When the high frequency component is high:<br>Turn clockwise the RV102/AU-72P (B-3 C) to adjust CH-1.<br>If not to meet by RV102, adjust by LV1/AU-72P (B-2 C).<br>Turn clockwise the RV202/AU-72P (B-1 C) to adjust CH-2.<br>If not to meet by RV202, adjust by LV2/AU-72P (B-1 C).<br><br>After adjustment, check again.</td>
</tr>
</table>

## 10-20. OA FREQUENCY RESPONSE ADJUSTMENT (METAL)

Sec. 10-2. Level Volume Reference Position Adjustment should be completed.

<table>
<tr><th>Conditions for adjustment</th><th>Specifications</th><th>Adjustment</th></tr>
<tr>
<td>
• AUDIO IN CH-1/CH-2 connector:<br>
40 Hz, – 16 dBs<br>
1 kHz, – 16 dBs<br>
7 kHz, – 16 dBs<br>
10 kHz, – 16 dBs<br>
15 kHz, – 16 dBs<br><br>
• DOLBY NR: ON<br><br>
• Insert a BCT-20M and put the unit into the REC mode.<br><br>
• Playback the recorded tape using the BVW-75P (or equivalent) that the DOLBY switch is ON state.
</td>
<td>
AUDIO OUT CH-1/CH-2 connector/BVW-75P (or equivalent)<br><br>
<table>
<tr><th>Frequency</th><th>Level</th></tr>
<tr><td>40 Hz</td><td>Reference $^{+2.5}_{-2.0}$ dB</td></tr>
<tr><td>1 kHz</td><td>Reference</td></tr>
<tr><td>7 kHz</td><td>Reference ± 1.0 dB</td></tr>
<tr><td>10 kHz</td><td>Reference ± 1.0 dB</td></tr>
<tr><td>15 kHz</td><td>Reference ± 1.0 dB</td></tr>
</table>
</td>
<td>
When the high frequency component is low:<br>
• 7 kHz to 10 kHz (CH-1)<br>
Turn counterclockwise the RV105/AU-72P (C-3 C) to adjust CH-1.<br>
• around 15 kHz (CH-1)<br>
Turn clockwise the LV3/AU-72P (B-3 C) to adjust CH-1.<br>
• 7 kHz to 10 kHz (CH-2)<br>
Turn counterclockwise the RV205/AU-72P (B-1 C) to adjust CH-2.<br>
• around 15 kHz (CH-2)<br>
Turn clockwise the LV4/AU-72P (B-1 C) to adjust CH-2.<br><br>
When the high frequency component is high:<br>
• 7 kHz to 10 kHz (CH-1)<br>
Turn clockwise the RV105/AU-72P (C-3 C) to adjust CH-1.<br>
• around 15 kHz (CH-1)<br>
Turn counterclockwise the LV3/AU-72P (B-3 C) to adjust CH-1.<br>
• 7 kHz to 10 kHz (CH-2)<br>
Turn clockwise the RV205/AU-72P (B-1 C) to adjust CH-2.<br>
• around 15 kHz (CH-2)<br>
Turn counterclockwise LV4/AU-72P (B-1 C) to adjust CH-2.<br><br>
After adjustment, check again.
</td>
</tr>
</table>

## 10-21. RECORDING CURRENT ADJUSTMENT (OXIDE)

Sec. 10-2. Level Volume Reference Position Adjustment should be completed.

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • AUDIO IN CH-1/CH-2 connector: 1 kHz, +4 dBs<br>• Insert a BCT-20G and put the unit into the REC mode.<br>• Playback the recorded tape using the BVW-75P (or equivalent). | AUDIO OUT CH-1/CH-2 connector/BVW-75P<br>+4.0±0.2 dBm | CH-1:<br>RV101/AU-72P (B-2 C)<br>CH-2:<br>RV201/AU-72P (B-1 C) |

After adjustment, perform Sec. 10-22. Record Current Adjustment (Metal).

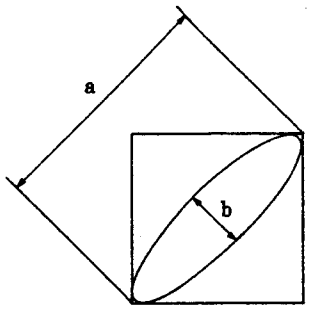
## 10-22. RECORDING CURRENT ADJUSTMENT (METAL)

Sec. 10-2. Level Volume Reference Position Adjustment should be completed.

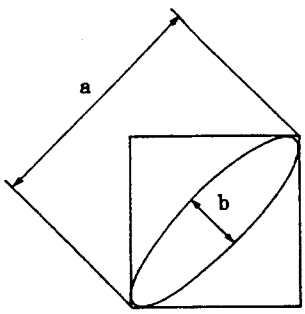
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • AUDIO IN CH-1/CH-2 connector: 1 kHz, +4 dBs<br>• Insert a BCT-20M and put the unit into the REC mode.<br>• Playback the recorded tape using the BVW-75P (or equivalent). | AUDIO OUT CH-1/CH-2 connector/BVW-75P (or equivalent)<br>+4.0±0.2 dBm | CH-1:<br>RV104/AU-72P (B-2 C)<br>CH-2:<br>RV204/AU-72P (B-1 C) |

After adjustment, perform Sec. 10-21. Recording Current Adjustment (Oxide).

## 10-23. PHASE COMPENSATION BETWEEN THE CH-1 AND CH-2 (OXIDE)

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • AUDIO IN CH-1/CH-2 connector: 15 kHz, +4 dBs<br>• Insert a BCT-20G and put the unit into the REC mode.<br>• Playback the recorded tape using the BVW-75P (or equivalent). | AUDIO OUT CH-1/CH-2 connector/BVW-75P (or equivalent).<br>Oscilloscope/XY mode<br>Check that the lissajous waveform meets the required specification.<br>  <br>*Spec.:* $\frac{b}{a} < \frac{1}{4}$ | ⊘ RV103/AU-72P (C-2 C)<br>• After adjustment, check again. |

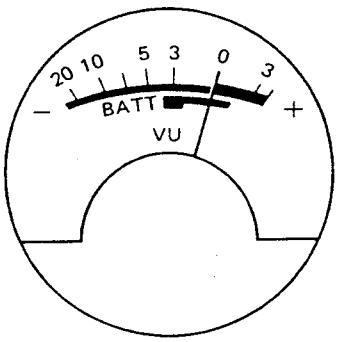
## 10-24. PAHSE COMPENSATION BETWEEN THE CH-1 AND CH-2 (METAL)

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • AUDIO IN CH-1/CH-2 connector: 15 kHz, +4 dBs<br>• Insert a BCT-20M and put the unit into the REC mode.<br>• Playback the recorded tape using the BVW-75P (or equivalent). | AUDIO OUT CH-1/CH-2 connector/BVW-75P (or equivalent).<br>Oscilloscope/XY mode<br>Check that the lissajous waveform meets the required specification.<br>  <br>*Spec.:* $\frac{b}{a} < \frac{1}{4}$ | ⊘ RV106/AU-72P (C-2 C)<br>• After adjustment, check again. |

## 10-25. AFM OSCILLATING FREQUENCY ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M and, put the unit into the STANDBY mode.<br><br>• Short between the TP601/VA-52P (B-5 C) and the E602/VA-52P (C-2 C) with a shorting clip.<br>Short between the TP602/VA-52P (B-5 C) and the E602/VA-52P (C-2 C) with a shorting clip.<br><br>• After the adjustment, remove the shorting clips. | TP603/VA-52P (B-5 C)<br>E601/VA-52P (C-5 C)<br><br>310±1 kHz<br><br>TP604/VA-52P (C-5 C)<br>E601/VA-52P (C-5 C)<br><br>540±1 kHz | ⊘ RV605/VA-52P (A-6 C)<br><br>⊘ RV606/VA-52P (B-6 C) |

## 10-26. AFM METER ADJUSTMENT

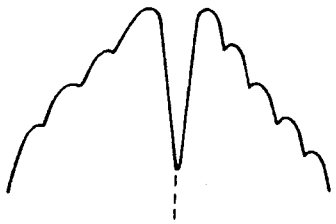
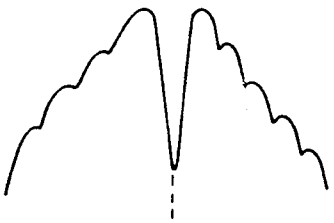
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Insert a BCT-20M, and put the unit into the STANDBY mode.<br><br>•AUDIO IN CH-3/CH-4 connector: 400 Hz, +4 dBs | CH-3: TP621/VA-52P (B-5 C)<br>CH-4: TP622/VA-52P (B-5 C)<br><br>−15.3 dBs | Audio Level Volume<br>CH-3<br>CH-4 |
| STEP 2.<br>• MONITOR SELECT LNG AFM: AFM<br><br>• Insert a BCT-20M, and put the unit into the STANDBY mode.<br><br>• AUDIO IN CH-3/CH-4 connector: 400 Hz, +4 dBs | Audio level meter CH-1/CH-3, CH-2/CH-4<br><br>Level meter<br>  <br><br>The pointer should stay at 0. | CH3:<br>⊘ RV618/VA-52P (B-4 C)<br><br>CH4:<br>⊘ RV619/VA-52P (C-4 C) |

## 10-27. AFM CLIPPER ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• MONITOR SELECT LNG AFM: AFM<br>• Insert a BCT-20M, and put the unit into the STANDBY mode.<br>• AUDIO IN CH-3/CH-4 connector: 400 Hz, +4 dBs | CH-3: TP621/VA-52P (B-5 C)<br>CH-4: TP622/VA-52P (B-5 C)<br>−15.3±0.1 dBs | Audio Level Volume<br>CH-3<br>CH-4 |
| STEP 2.<br>• AUDIO IN CH-3/CH-4 connector: 400 Hz, +24 dBs<br>• Turn fully clockwise the RV601/ VA-52P (B-5 C) and RV602/ VA-52P (B-5 C).<br>• Insert a BCT-20M, and put the unit into the REC mode. | CH-3: TP603/VA-52P (C-5 C)<br>CH-4: TP604/VA-52P (C-5 C)<br>87.0±0.5 kHz | CH-3:<br>⊘ RV620/VA-52P (B-5 C)<br>CH-4:<br>⊘ RV621/VA-52P (B-5 C) |

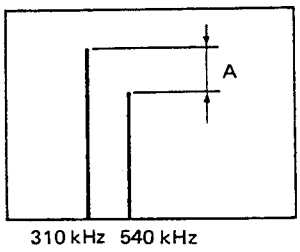
## 10-28. AFM DEVIATION ADJUSTMENT

The sec. 11-20 Recording Current Adjustment is completed previously.

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Input audio signal: CH-3, CH-4 no signal<br>• Connect the 10.395 kHz signal (−15.3 dBs) to TP621/VA-52P (B-5 C)<br>• Insert a BCT-20M cassette tape.<br>• STANDBY mode | TP603/VA-52P (B-5 C)<br>Spectrum Analyzer<br>  <br>310 kHz<br>Minimize the level at 310 kHz. | ⊘ RV601/VA-52P (B-5 C) |
| STEP 2.<br>• Disconnect the signal from TP621, and connect this signal to TP622/VA-52P (B-5 C) | TP604/VA-52P (C-5 C)<br>  <br>540 kHz<br>Minimize the level at 540 kHz. | ⊘ RV602/VA-52P (B-5 C) |

## 10-29. AFM RECORDING CURRENT ADJUSTMENT

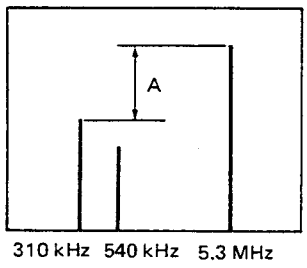
### 10-29-1. AFM Recording Current Adjustment (1)

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Input video signal: 100% Color Bars<br>• Input audio signal: CH-3, CH-4 no signal<br>• Insert a BCT-20M cassette tape.<br>• REC mode<br>• Spectrum analyzer setting:<br>RBW 30 kHz<br>VBW 30 kHz<br>ST more than 8 sec. | TP603/VA-52P (C-5 C)<br>Oscilloscope<br>0.18±0.005 Vp-p<br>Spectrum Analyzer<br>  <br>A = 3±0.5 dB<br>TRIG; TP607/VA-52P (C-5 C) | ⊘ RV608/VA-52P (C-5 C)<br>⊘ RV608/VA-52P (C-5 C) |

## 10-29-2. AFM Recording Current Adjustment (2)

Be sure to carry out the following adjustments before this adjustment.

11-13-3. C Secondary Distortion Adjustment
11-14-2. C Recording Current Adjustment (Metal)
11-14-4. C Recording Current Frequency Response Adjustment (Metal)
11-14-12. C Overall Frequency Response Adjustment (Metal)

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Disconnect the CN9/VA-52P (D-1 C)<br>• Connect the extension harness between the CN9 and the harness.<br>• Connect the current prove to the pin 3 of the extension harness.<br>• Input video signal: 100% Color Bars<br>• Input audio signal: CH-3, CH-4 no signal<br>• Insert a BCT-20M cassette tape.<br>• REC mode | CN9-3<br>Spectrum Analyzer<br>  <br><br>A = 21.5±1 dB | ⊘ RV609/VA-52P (C-5 C) |

## 10-30. AFM PLAYBACK LEVEL ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Playback the AFM signal segment on the alignment tape CR5-1B PS. | TP605/VA-52P (A-4 C) (GND; E601 (C-5 C))<br>TP606/VA-52P (A-4 C) (GND; E602 (C-2 C))<br><br>CH-3; −15.3±0.2 dB<br>CH-4; −15.3±0.2 dB | CH-3<br>⊘ RV603/VA-52P (B-5 C)<br>CH-4<br>⊘ RV604/VA-52P (B-5 C) |

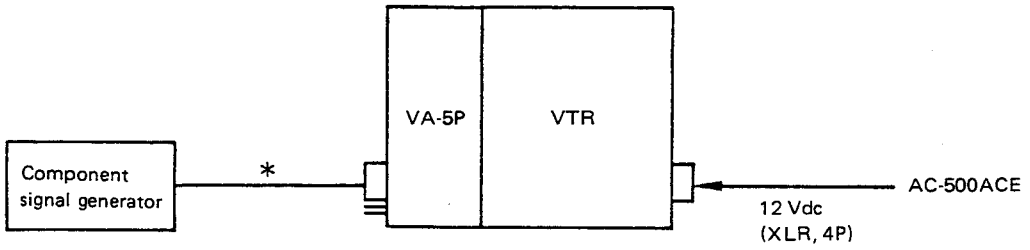
# SECTION 11
# VIDEO SYSTEM ALIGNMENT

[Equipment Required]

- Component Signal Generator; TEKTRONIX TSG-300 or equivalent
- Composite Signal Generator; TEKTRONIX 1411 or equivalent
- Composite Adaptor; VA-5P
- Digital Voltmeter
- Dualtrace Oscilloscope
- Frequency Counter
- Sweep Generator
- Spectrum Analizer
- Regulated DC Power Supply; AC-500ACE or equivalent
- Waveform Vector Monitor; TEKTRONIX 1751

[Connection]

- If the REF. SYNC signal is not supplied to the 50 pin connector of BVV-5PS, the unit cannot put into the REC mode. Therefore connect as follows.




* The cable which connects Component Signal Generator and VA-5P is registered as the fixture for service.
J-6031-840-A
Multiconnector Cable

[Mode]

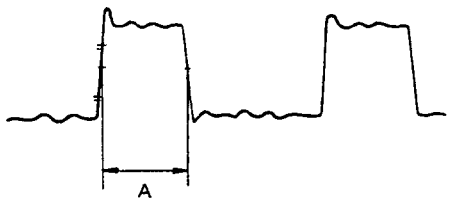
- When VA-5P (Composite Adaptor) is connected to VTR and the POWER is turned ON, VTR is automatically set to the STANDBY mode.
- When REC button of VA-5P is pressed, VTR is set to the REC mode.
- For releasing REC mode, press the REC button again.
- For playing back the recorded tape, press the REW button of the VTR and press the STOP button of the VTR after rewinding the particular point. (At that time, though VTR drum is rotating, the tape arround the drum is set to the tension release mode.) Then, press the PLAY button.
- When playing back the alignment tape, insert it into the VTR and then press the PLAY button.

[Measuring and Adjustment point]

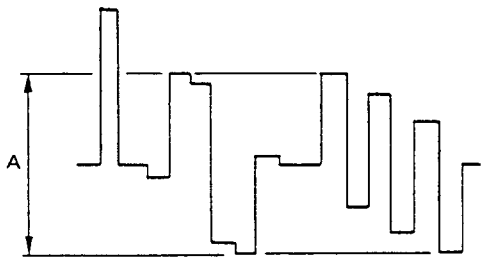
- The English letters and figures put in parentheses after the measuring and adjustment points expression means the location on the printed circuit board.
(Example) TP208/VA-52P (E-6 C)
It means that TP208 on the VA-52P Board is on the E-6 location and the component side.

## 11-1. CCD ADJUSTMENT

### 11-1-1. CCD Clock Duty Adjustment

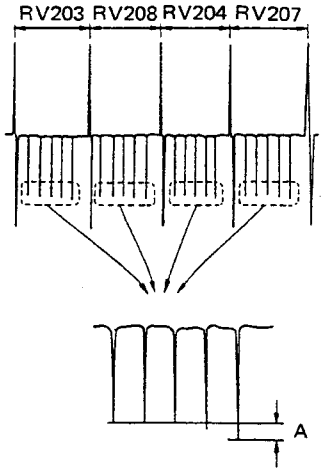
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: 75% Color Bars<br>• STANDBY mode | TP210/VA-52P (E-6 C)<br>  <br><br>A = 38±1 nsec<br>TRIG; INT | ⊘ RV211/VA-52P (D-7 C) |

### 11-1-2. CCD Output Level Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: 75% Color Bars<br>• Turn RV215/VA-52P (F-6 C) fully counterclockwise.<br>• STANDBY mode | TP102/VA-52P (D-5 C)<br>  <br><br>A = each CCD output Level = 0.7±0.01 V<br>Measure the lower side of the noise amplitude.<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV202/VA-52P (F-6 C)<br>⊘ RV205/VA-52P (G-6 C)<br>⊘ RV201/VA-52P (F-7 C)<br>⊘ RV206/VA-52P (G-7 C) |

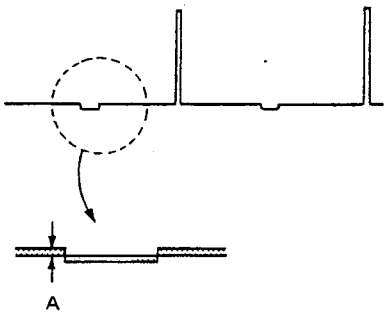
Note: After the adjustment, check the sec. 11-1-3 CCD Linearity Adjustment. Repeat the sec. 11-1-2 and the sec. 11-1-3 until each specifications are satisfied at one time.

## 11-1-3. CCD Linearity Adjustment

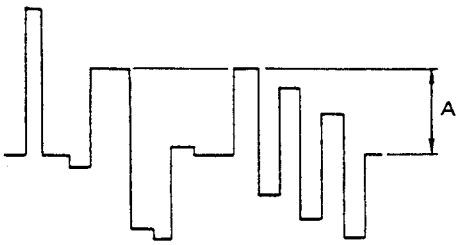
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: 75% 5 Step Staircase<br>• STANDBY mode | TP102/VA-52P (D-5 C)<br>WFM (DIFFD STEP)<br>  <br><br>Minimize the difference between the highest and lowest levels.<br>A = 0±2 % | ⊘ RV203/VA-52P (F-7 C)<br>⊘ RV208/VA-52P (G-6 C)<br>⊘ RV204/VA-52P (G-7 C)<br>⊘ RV207/VA-52P (G-7 C)<br><br>Note: Turn each volume counerclockwise first. Turn slightly to the right (clockwise) and adjust them. |

Note: After this adjustment, check the sec. 11-1-2 CCD Output Level Adjustment. Repeat the sec. 11-1-2 and the sec. 11-1-3 until the specifications are satisfied at one time.

## 11-1-4. CCD Output Waveform Flatness Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: 100% Flat Field<br>• STANDBY mode | TP102/VA-52P (D-5 C)<br>  <br><br>A ≦ 4 mV<br><br>TRIG: TP208/VA-52P (E-6 C) | ⊘ RV216/VA-52P (E-6 C) |

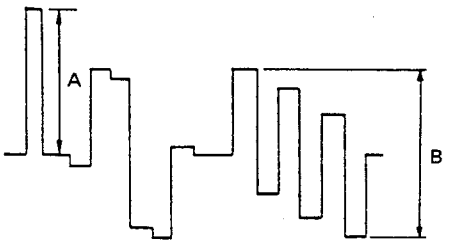
## 11-2. 100% COLOR BARS SLICE LEVEL ADJUSTMENT

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: 75% Color Bars<br>• Turn RV201/VA-52P (G-7 C) fully counterclockwise.<br>• Turn RV215/VA-52P (F-6 C) fully counterclockwise.<br>• STANDBY mode | TP102/VA-52P (D-5 C)<br>  <br><br>A = 0.62±0.01 V<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV215/VA-52P (E-6 C) |

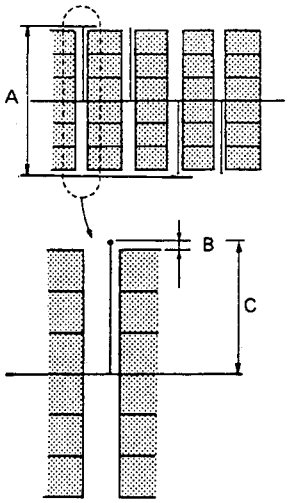
Note: After this adjustment, perform the sec. 11-1-2 CCD Output Level Adjustment (RV201).

## 11-3. C-REF. SYNC ADJUSTMENT

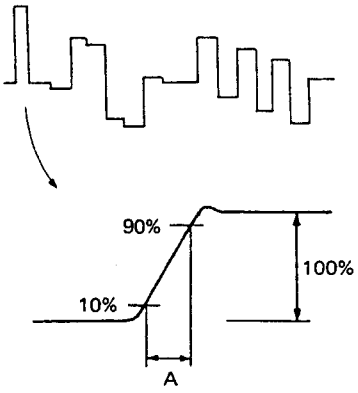
### 11-3-1. C-REF. Sync Level Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: 75% Color Bars<br>• STANDBY mode | TP102/VA-52P (D-5 C)<br>  <br><br>With level B as 0.700 V reference,<br>A = 0.84±0.02 V<br>TRIG: TP208/VA-52P (E-6 C) | ⊘ RV102/VA-52P (D-6 C) |

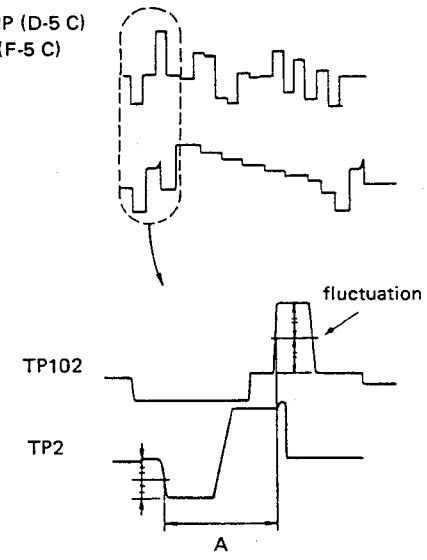
## 11-3-2. 4 Field/15H Pulse Level Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: 75% Color Bars | TP102/VA-52P (D-5 C)<br>  <br>A = 0.7±0.05 V<br>B = 0±0.05 V<br>With level A as 0.700 V reference,<br>C = 0.35±0.05 V<br>TRIG; TP16/SS-31P (E-2 C) | For A Adj.<br>RV218/VA-52P (G-5 C)<br>For B Adj.<br>RV220/DUS-194 on the VA-52P board. |

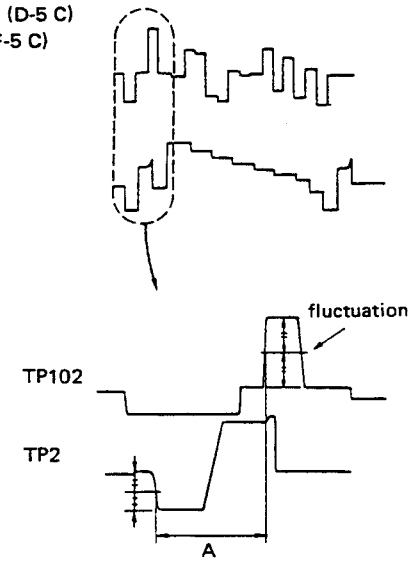
## 11-3-3. C-REF. Sync Trapezoid Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: 75% Color Bars<br>• STANDBY mode | TP102/VA-52P (D-5 C)<br>  <br>A = 220±20 nsec<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ FL104/VA-52P (E-6 C) |

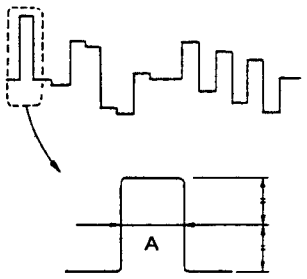
## 11-3-4. C-REF. Sync Position Adjustment (Metal)

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: 75% Color Bars<br>• STANDBY mode | TP102/VA-52P (D-5 C)<br>TP2/VA-52P (F-5 C)<br>  <br>A = 3.1 μsec<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV219/VA-52P (C-7 C) |

## 11-3-5. C-REF. Sync Position Adjustment (Oxide)

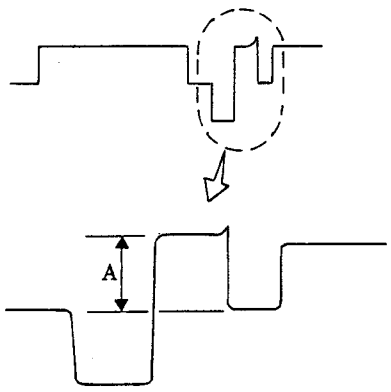
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20G cassette tape.<br>• Input signal: 75% Color Bars<br>• STANDBY mode | TP102/VA-52P (D-5 C)<br>TP2/VA-52P (F-5 C)<br>  <br><br>A = 3.1 μsec<br>TRIG: TP208/VA-52P (E-6 C) | ⊘ RV210/VA-52P (C-7 C) |

## 11-3-6. C-REF. Sync Pulse Width Adjustment

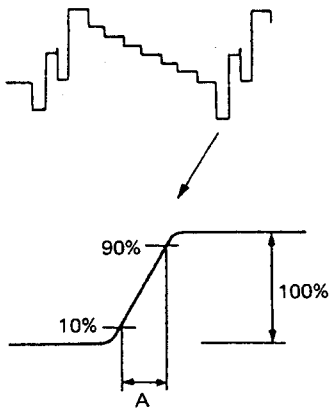
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input a signal: 75% Color Bars<br>• STANDBY mode | TP102/VA-52P (D-5 C)<br>  <br><br>A = 2.0 ±0.05 μ sec<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV214/VA-52P (B-7 C) |

## 11-4. Y-REF. SYNC ADJUSTMENT

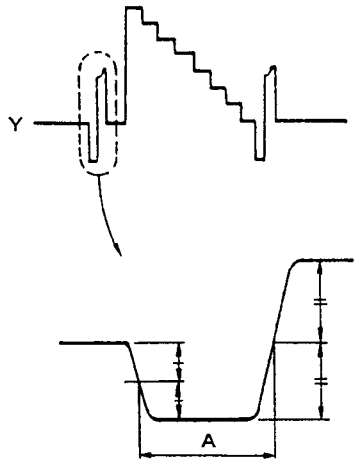
### 11-4-1. Y-REF. Sync Level Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: 50% Flat Field<br>• STANDBY mode | TP2/VA-52P (F-5 C)<br>  <br><br>A = 375±25 mVp-p<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV2/VA-52P (E-5 C) |

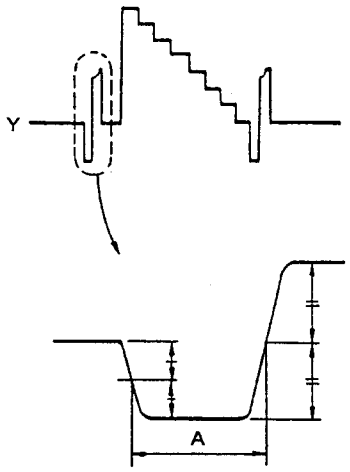
### 11-4-2. Y-REF. Sync Trapezoid Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: 75% Color Bars<br>• STANDBY mode | TP2/VA-52P (F-5 C)<br>  <br><br>A = 180±20 nsec<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ FL4/VA-52P (F-5 C) |

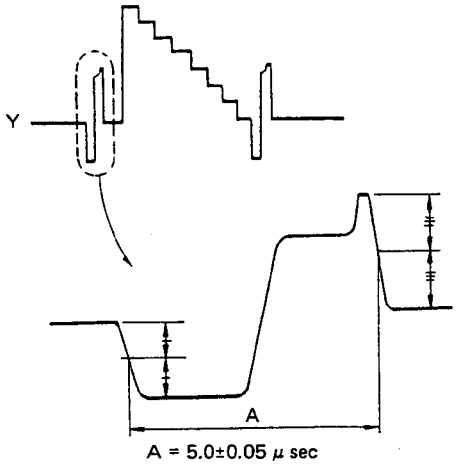
## 11-4-3. Y-REF. Sync Position Adjustment (Metal)

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape<br>• Input signal: 75% Color Bars<br>• STANDBY mode | TP2/VA-52P (F-5 C)<br>  <br><br>A = 2.65±0.02 μ sec<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV212/VA-52P (C-7 C) |

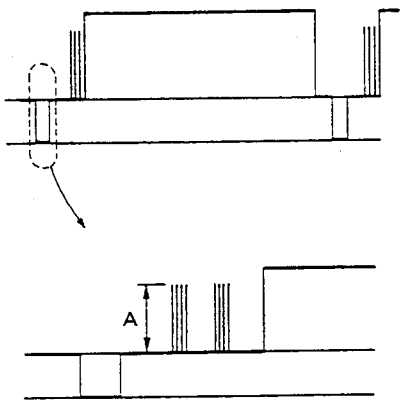
## 11-4-4. Y-REF. Sync Position Adjustment (Oxide)

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| •Insert a BCT-20G cassette tape.<br>• Input signal: 75% color bars<br>• STANBY mode | TP2/VA-52P (F-5 C)<br>  <br><br>A = 2.65±0.02 μ sec<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV217/VA-52P (C-7 C) |

## 11-4-5. Y-REF. Sync Pulse Width Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: 75% Color Bars<br>• STANBY mode | TP2/VA-52P (F-5 C)<br>  <br><br>A = 5.0±0.05 μ sec<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV213/VA-52P (C-7 C) |

## 11-5. VITC LEVEL ADJUSTMENT

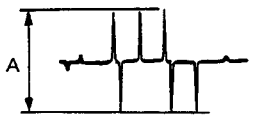
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: 75% Color Bars<br>• STANDBY mode | TP2/VA-52P (F-5 C)<br>  <br><br>A = 80±2 IRE<br>TRIG; TP16/SS-31P (E-2 C) | ⊘ RV1/VA-52P (E-5 C) |

## 11-6. HIGH FREQUENCY PRE-EMPHASIS ADJUSTMENT

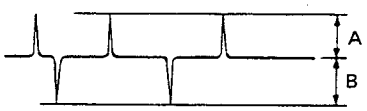
### 11-6-1. Y-High Frequency Pre-emphasis Bias Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: Pulse and Bar<br>• STANDBY mode | TP3/VA-52P (F-5 C)<br> <br><br>A = B±4 %<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV7/VA-52P (E-5 C) |

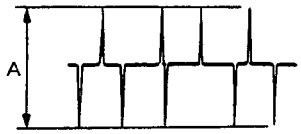
### 11-6-2. Y-High Frequency Pre-emphasis Level Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: Pulse and Bar<br>• STANDBY mode | TP3/VA-52P (F-5 C)<br>  <br><br>A = 88±2 mV<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV3/VA-52P (E-5 C) |

### 11-6-3. C-High Frequency Pre-emphasis Bias Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: Pulse & Bar<br>• STANDBY mode | TP103/VA-52P (D-5 C)<br>  <br><br>A = B±4 %<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV107/VA-52P (D-5 C) |

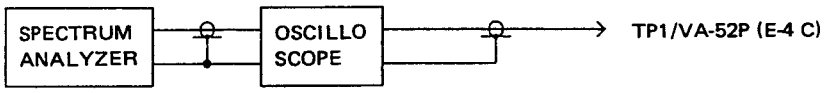
## 11-6-4, C-High Frequency Pre-emphasis Level Adjustment

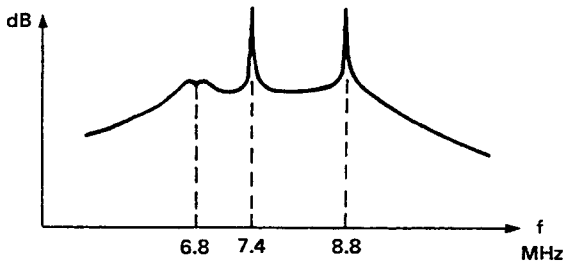
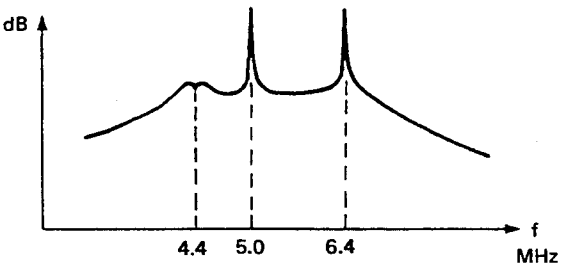
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: Pulse and Bar<br>• STANDBY mode | TP103/VA-52P (D-5 C)<br>  <br><br>A = 95±2 mV<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV103/VA-52P (D-5 C) |

## 11-7. CARRIER/DEVIATION ADJUSTMENT

### 11-7-1. Y Carrier/Deviation Adjustment

[Connection]

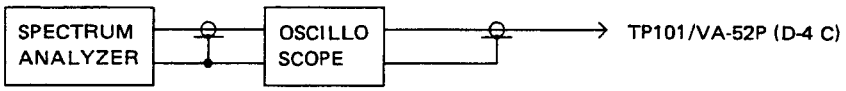


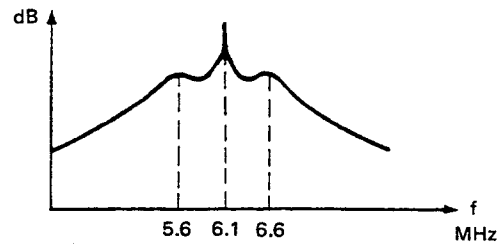

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: 100% Flat Field<br>• STANDBY mode | TP1/VA-52P (E-4 C)<br>  <br>• Deviation adjustment<br>Make 1.4 MHz deviation between two peaks.<br>• Sync tip carrier adjustment<br>Make the left side peak to 6.8 MHz. | • Sync tip adjustment<br>⊘ RV8/VA-52P (F-4 C)<br>• Deviation adjustment<br>⊘ RV4/VA-52P (F-5 C) |
| STEP 2.<br>• Insert a BCT-20G cassette tape.<br>• STANDBY mode |  <br>• Sync tip carrier adjustment<br>Make the left side peak to 4.4 MHz. | Sync tip adjustment<br>⊘ RV9/VA-52P (F-4 C)<br>Deviation adjustment<br>⊘ RV24/VA-52P |

| | | |
|---|---|---|
| STEP 3.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: 100% Flat Field<br>• REC mode<br>• Play back the recorded tape with BVW-75P. | Check that the deviation is correct. | |
| STEP 4.<br>• Insert a BCT-20G cassette tape.<br>• Input signal: 100% Flat Field<br>• REC mode.<br>• Play back the recorded tape with BVW-75P or equivalent. | Check that the deviation is correct. | |

## 11-7-2. C Carrier/Deviation Adjustment

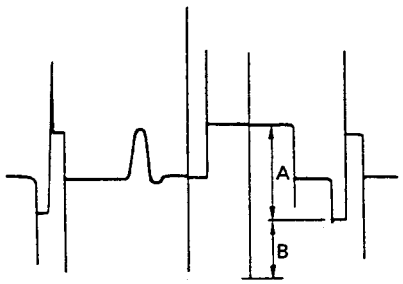
[Connection]



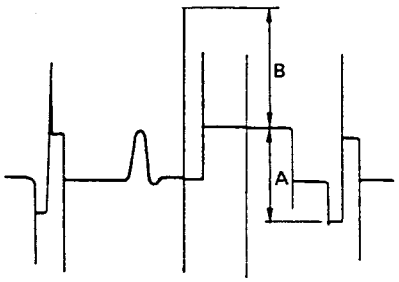

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: 75% Color Bars<br>• STANDBY mode | TP101/VA-52P (D-4 C)<br>  <br><br>• Carrier adjustment<br>Make the center peak to 6.1 MHz.<br>• Deviation adjustment<br>Make 1.0 MHz deviation between two peaks (5.6 MHz and 6.6 MHz). | • Carrier<br>⊘ RV108/VA-52P (E-4 C)<br>• Deviation<br>⊘ RV104/VA-52P (D-5 C)<br>Adjust alternately RV108 and RV104. |
| STEP 2.<br>• Insert a BCT-20G cassette tape.<br>• STANDBY mode | • Carrier adjustment<br>Make the center peak to 4.5 MHz.<br>• Deviation adjustment<br>Make 1.0 MHz deviation between two peaks (4.0 MHz and 5.0 MHz). | • Carrier<br>⊘ RV109/VA-52P (E-4 C)<br>• Deviation<br>⊘ RV124/DUS-194 on the VA-52P board. |
| STEP 3.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: 75% Color Bars<br>• REC mode<br>• Play back the recorded tape with BVW-75P. | Check that the deviation is correct. | |
| STEP 4<br>• Insert a BCT-20G cassette tape.<br>• Input signal: 75% Color Bars<br>• REC mode<br>• Playback the recorded tape with BVW-75P or equivalent. | Check that the deviation is correct. | |

## 11-8. WHITE/DARK CLIP ADJUSTMENT

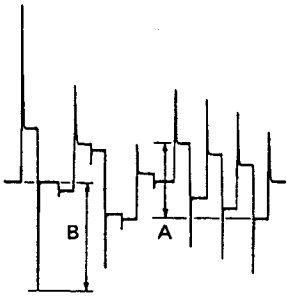
### 11-8-1. Y Dark Clip Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Insert a BCT-20G cassette tape.<br>• Input signal: Pulse and Bar<br>• STANDBY mode | TP5/VA-52P (E-4 C)<br>  <br><br>A = 100% (reference)<br>B = 65±2.5%<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV6/VA-52P (F-5 C) |
| STEP 2.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: Pulse and Bar<br>• Y VIDEO: +6 dB<br>• STANDBY mode | (0 dB) A = 100% (reference)<br>(+6 dB) B = 150±2.5% | ⊘ RV23/VA-52P (F-5 C) |

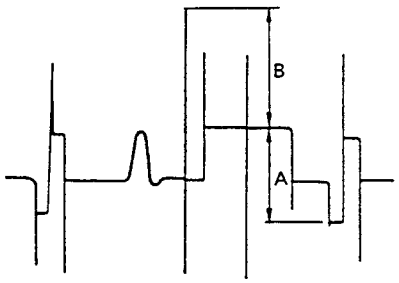
### 11-8-2. Y White Clip Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: Pulse and Bar<br>• STANDBY mode<br>• Turn fully RV3/VA-52P (E-5 C) clockwise. | TP5/VA-52P (E-4 C)<br>  <br><br>A = 100% (reference)<br>B = 150±2.5 %<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV5/VA-52P (F-5 C) |

## 11-8-3. C Low Clip Adjustment

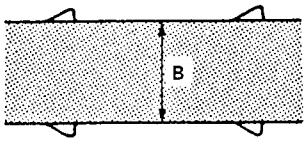
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Insert a BCT-20G cassette tape.<br>• Input signal: 75% Color Bars<br>• STANDBY mode | TP105/VA-52P (D-4 C)<br>  <br><br>A = 100% (reference)<br>B = 165±5%<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV106/VA-52P (E-5 C) |
| STEP 2.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: 75% Color Bars<br>• C VIDEO: +6 dB<br>• STANDBY mode | (0 dB) A = 100% (reference)<br>(+6 dB) B = 270±20% | |

## 11-8-4. C High Clip Adjustment

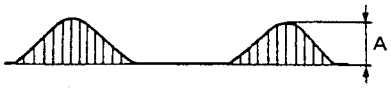
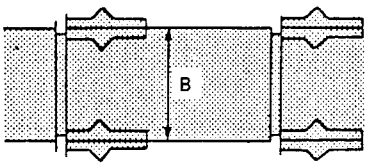
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: Pulse and Bar<br>• C VIDEO: +6 dB<br>• STANDBY mode | TP105/VA-52P (D-4 C)<br>  <br><br>(0dB) A = 100% (reference)<br>(+6dB) B = 350±5%<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV105/VA-52P (E-5 C) |

## 11-9. HF ADJUSTMENT

### 11-9-1. Y-HF Adjustment

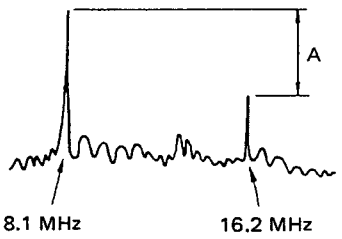
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1<br>• Input signal: 100% Wideband Line Sweep<br>• Insert a BCT-20M cassette tape.<br>• STANDBY mode | TP4/VA-52P (F-4 C)<br> <br><br>A = 10±2 mVp-p | ⊘ RV11/VA-52P (E-4 C) |
| STEP 2 | TP10/VA-52P (E-3 C)<br>  <br><br>B = 500±10 mV<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV12/VA-52P (F-4 C) |

### 11-9-2. C-HF Adjustment

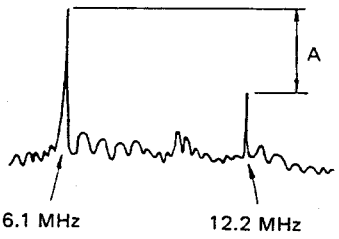
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal:<br>Y: Flat Field<br>R-Y: H Sweep signal (1.0 Vp-p, terminated by 75 ohms) that is generated with sweep generator. This generator should be GEN. Looked to PAL signal generator.<br>B-Y: No signal<br>• STANDBY mode | CH-1; TP110/VA-52P (E-3 C)<br>CH-2; TP104/VA-52P (D-4 C)<br>TP104<br>  <br><br>A = 20±1 mV<br>TP110<br>  <br><br>B = 350±10 mV<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV111/VA-52P (E-4 C)<br>⊘ RV112/VA-52P (E-4 C) |

## 11-10. MODULATOR CARRIER BALANCE ADJUSTMENT

### 11-10-1. Y Modulator Carrier Balance Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: 50% Flat Field<br>• STANDBY mode | TP10/VA-52P (E-3 C)<br>  <br><br>Minimize the component at the 16.2 MHz.<br>(A ≧ 40 dB) | ⊘ RV10/VA-52P (E-5 C) |

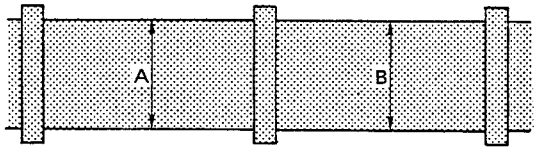
### 11-10-2. C Modulator Carrier Balance Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Insert a BCT-20M cassette tape.<br>• Input signal: Y: 100% Flat Field<br>R-Y, B-Y: No signal<br>• STANDBY mode | TP110/VA-52P (E-3 C)<br>  <br><br>Minimize the component at the 12.2 MHz.<br>(A ≧ 40 dB) | ⊘ RV110/VA-52P (D-5 C) |

## 11-11. PB RF LEVEL ADJUSTMENT

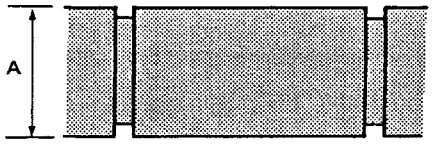
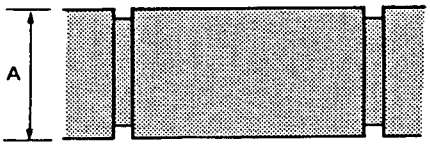
### 11-11-1. Y PB RF Level Adjustment

• In this adjustment, check that the composite adaptor (VA-5P) is disconnected from the VTR.

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Playback the FLAT FIELD segment on the alignment tape CR5-1B PS. | TP301/VA-52P (G-3 C)<br><br>TP301<br>  <br><br>A = B = 0.44±0.1 V<br><br>TRIG; TP16/SS-31P (E-2 C) | CH1;<br>RV305/VA-52P (E-1 C)<br>CH2;<br>RV306/VA-52P (F-1 C) |

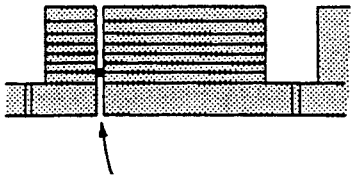
## 11-11-2. C PB RF Level Adjustment

• In this adjustment, check that the composite adaptor (VA-5P) is disconnected from the VTR.

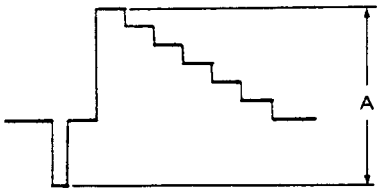
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Playback the FLAT FIELD segment on the alignment tape CR5-1B PS. | CH-1; TP303/VA-52P (G-3 C)<br>CH-2; TP304/VA-52P (G-2 C)<br>TP303<br>  <br><br>A = 0.44±0.1 V<br>TP304<br>  <br><br>A = 0.44±0.1 V<br>TRIG; TP16/SS-31P (E-2 C) | ⊘ RV307/VA-52P (F-1 C)<br>⊘ RV308/VA-52P (F-1 C) |

## 11-12. VIEW FINDER PB ADJUSTMENT

### 11-12-1. View Finder PB DOC Adjustment

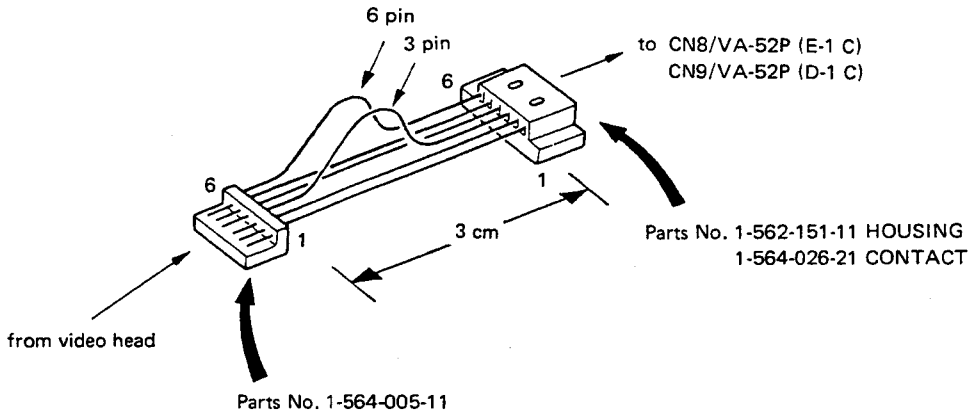
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Playback the DOC check signal segment on the alignment tape CR5-1B PS. | TP305/VA-52P (F-4 C)<br>  <br>Adjust the drop out portion to 6th line from the top.<br>TRIG; TP16/SS-31P (E-2 C) | ⊘ RVB (IC304)/VA-52P (F-4 C) |

## 11-12-2. View Finder PB Output Level Adjustment

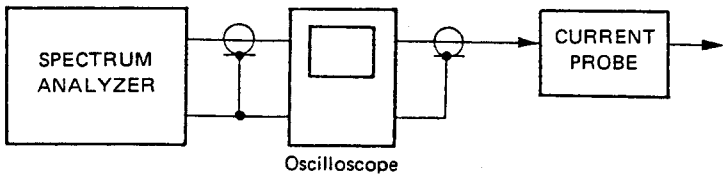
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Playback the color bars segment on the alignment tape CR5-1B PS.<br><br>• After this adjustment, perform the sec. 11-12-1 View Finder PB DOC Adjustment. Repeat the sec. 11-12-2 View Finder PB Output Level Adjustment and the sec. 11-12-1 View Finder PB DOC Adjustment until each specifications are satisfied at one time. | TP305/VA-52P (F-4 C)<br>  <br>A = 1.0±0.1 V<br><br>TRIG; TP16/SS-31P (E-2 C) | ⊘ RVA (IC304)/VA-52P (F-4 C) |

## 11-13. SECONDARY DISTORTION ADJUSTMENT

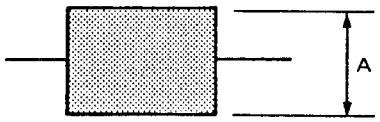
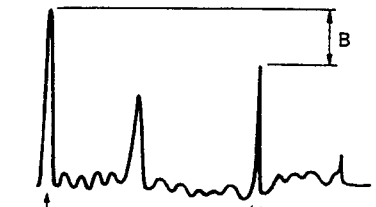
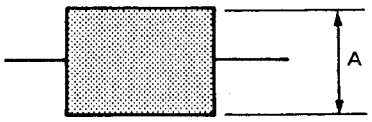
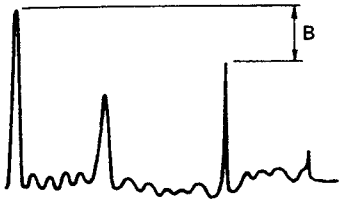
- Prepare the extension harness for adjustment as follows;



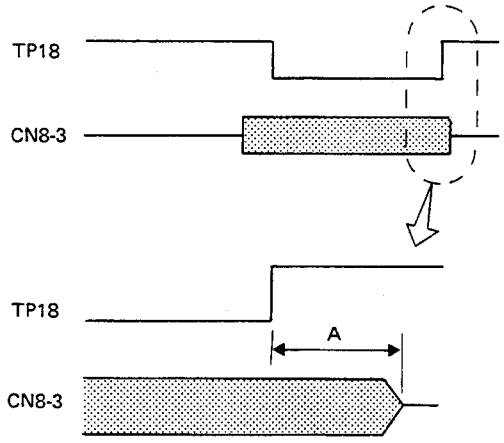
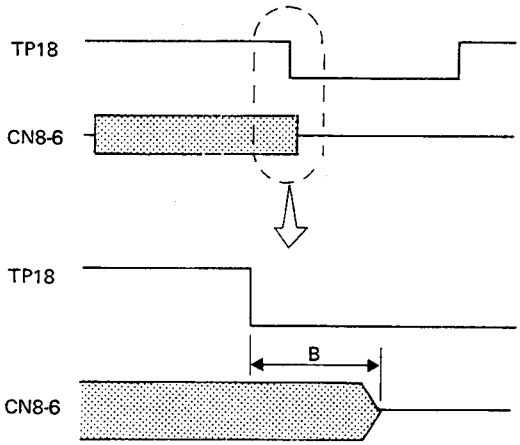

- Connection



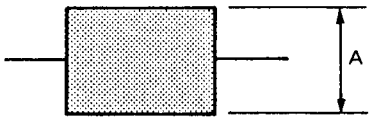
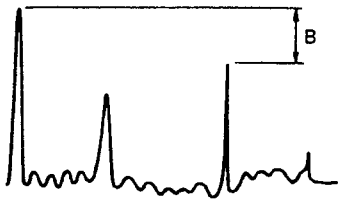
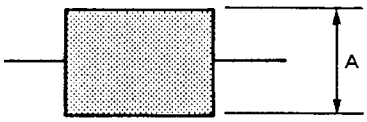
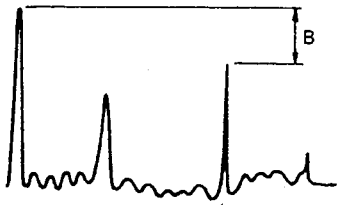
## 11-13-1. Y Secondary Distortion Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Disconnect the CN8/VA-52P (E-1 C)<br>• Connect the locally special made extension harness between the CN8 and harness.<br>• Connect the current probe to pin 3 of the extension harness.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: 50% Flat Field<br>• REC mode | CN8-3<br>Oscilloscope<br>  <br><br>Measure at the peak of the level.<br>A = 50 ± 5 mA<br>CN8-3<br>Spectrum Analyzer<br>  <br><br>Minimize the secondary distortion.<br>(B ≧ 40 dB) | ⊘ RV14/VA-52P (E-3 C)<br>⊘ RV21/VA-52P (E-3 C) |
| STEP 2.<br>• Connect the current probe to pin 6 of the extension harness.<br>• After this adjustment, disconnect the extension harness, and connect the connector from the head to CN8. | CN8-6<br>Oscilloscope<br>  <br><br>Measure at the peak of the level.<br>A = 50 ± 5 mA<br>CN8-6<br>Spectrum Analyzer<br>  <br><br>Minimize the secondary distortion.<br>(B ≧ 40 dB) | ⊘ RV16/VA-52P (E-3 C)<br>⊘ RV22/VA-52P (E-3 C) |

## 11-13-2. Y SW REC Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Disconnect the CN8/VA-52P (E-1 C)<br>• Connect the locally special made extension harness between the CN8 and harness.<br>• Connect the current probe to pin 3 of the extension harness.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: 50% Flat Field<br>• REC mode | CH1; TP18/SS-31P (F-6 C)<br>CH2; CN8-3<br>  <br>A = 240±10 μsec<br>TRIG; TP18/SS-31P (F-6 C) | ⊘ RV501/VA-52P (C-4 C) |
| STEP 2.<br>• Connect the current probe to pin 6 of the extension harness.<br>• After this adjustment, disconnect the extension harness, and connect the connector from the head to CN8. | CH1; TP18/SS-31P (F-6 C)<br>CH2; CN8-6<br>  <br>B = 210±20 μsec<br>Check that the specification is satisfied.<br>TRIG; TP18/SS-31P (F-6 C) | |

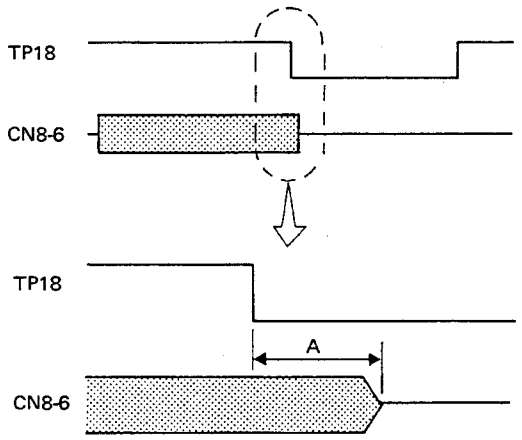
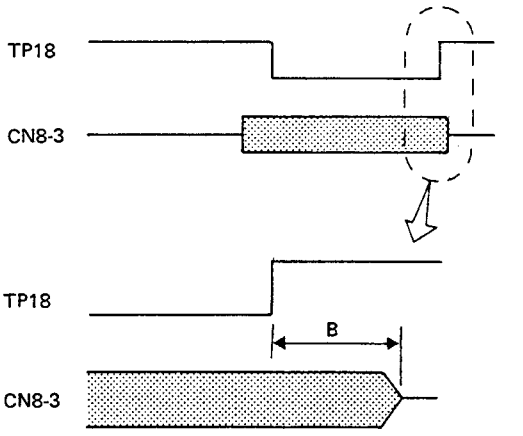
## 11-13-3. C Secondary Distortion Adjustment

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Disconnect the CN9/VA-52P (D-1 C)<br>• Connect the locally special made extension harness between the CN9 and harness.<br>• Connect the current probe to pin 3 of the extension harness.<br>• Turn RV609/VA-52P (C-5 C) fully clockwise.<br>• Input signal: Y: 100% Flat Field<br>R-Y, B-Y: No signal<br>• Insert a BCT-20M cassette tape.<br>• REC mode | CN9-3<br>Oscilloscope<br>  <br>Measure at the peak.<br>A = 60 mA<br>CN9-3<br>Spectrum Analyzer<br>  <br>Minimize the secondary distortion.<br>(B ≧ 40 dB) | ⊘ RV114/VA-52P (D-3 C)<br>⊘ RV121/VA-52P (D-3 C) |
| STEP 2.<br>• Connect the current probe to pin 6 of the extension harness.<br>• After the adjustment, disconnect the extension harness and connect the connector from the head to the CN9. | CN9-6<br>Oscilloscope<br>  <br>Measure at the peak.<br>A = 60 mA<br>CN9-6<br>Spectrum Analyzer<br>  <br>Minimize the secondary distortion.<br>(B ≧ 40 dB) | ⊘ RV116/VA-52P (E-3 C)<br>⊘ RV122/VA-52P (E-3 C) |

After this adjustment, the following adjustments should be performed.

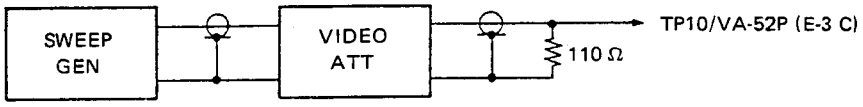
11-13-3. C Secondary Distortion Adjustment
11-14-2. C Recording Current Adjustment (Metal)
11-14-4. C Recording Current Frequency Response Adjustment (Metal)
11-14-12. C Overall Frequency Response Adjustment (Metal)
10-29-2. AFM Recording Current Adjustment (2)

## 11-13-4. C SW REC Adjustment

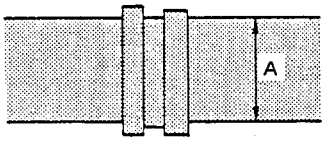
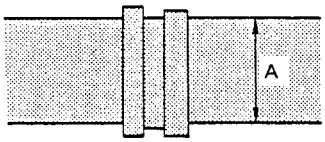
| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Disconnect the CN9/VA-52P (D-1 C)<br>• Connect the locally special made extension harness between the CN9 and harness.<br>• Connect the current probe to pin 6 of the extension harness.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: 50% Flat Field<br>• REC mode | CH1; TP18/SS-31P (F-6 C)<br>CH2; CN8-6<br>  <br>A = 840±20 μsec<br>TRIG; TP18/SS-31P (F-6 C) | ⊘ RV503/VA-52P (C-2 C) |
| STEP 2.<br>• Connect the current probe to pin 3 of the extension harness.<br>• After this adjustment, disconnect the extension harness, and connect the connector from the head to CN8. | CH1; TP18/SS-31P (F-6 C)<br>CH2; CN8-3<br>  <br>B = 840±20 μsec<br>TRIG; TP18/SS-31P (F-6 C) | ⊘ RV502/VA-52P (D-1 C) |

## 11-14. RECORDING CURRENT ADJUSTMENT

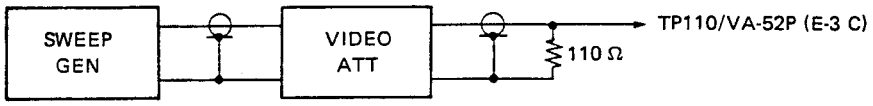
### 11-14-1. Y Recording Current Adjustment (Metal)



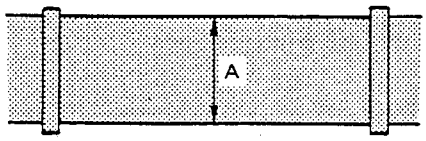
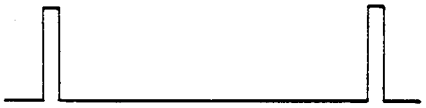
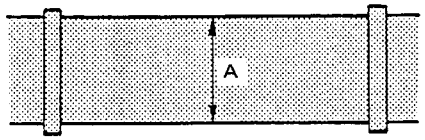

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Disconnect the CN20/VA-52P (E-4 C)<br>• Connect as shown in the figure. Input the 8.1 MHz continuous wave.<br>• Disconnect the CN8/VA-52P (E-1 C)<br>• Connect the extension harness between the CN8 and the harness.<br>• Connect the current probe to pin 3 of the extension harness.<br>• Short with a shorting clip between the TP401/VA-52P (D-1 C) and the GND.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: 50% Flat Field<br>• REC mode | TP301/VA-52P (G-3 C)<br>Maximize the waveform amplitude.<br><br>CN8-3<br>Measure the recording current value at the current probe. (YA) | Level control knob/<br>Signal generator |
| STEP 2.<br>• Connect the current probe to pin 6 of the extension harness. | TP302/VA-52P (G-3 C)<br>Maximize the waveform amplitude.<br><br>CN8-6<br>Measure the recording current value at the current probe. (YB) | Level control knob/<br>Signal generator |

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 3.<br>• Disconnect the 8.1 MHz signal from TP10/VA-52P (E-3 C)<br>• Remove the shorting clip between the TP401 and the GND.<br>• Connect the connector to the CN20.<br>• Connect the current probe to pin 3 of the extension harness.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: 50% Flat Field<br>• REC mode | TP2/VA-52P (F-5 C)<br> <br>CN8-3<br>  <br><br>Adjust to the (YA) which is measured in STEP 1. | ◐ RV14/VA-52P (E-3 C) |
| STEP 4.<br>• Connect the current probe to pin 6 of the extension harness.<br>• After the adjustment, disconnect the extension harness, and connect the connector of the harness to the CN8. | TP2/VA-52P (F-5 C)<br> <br>CN8-6<br>  <br><br>Adjust to the (YB) which is measured in STEP 2.<br>TRIG; TP208/VA-52P (E-6 C) | ◐ RV16/VA-52P (E-3 C) |

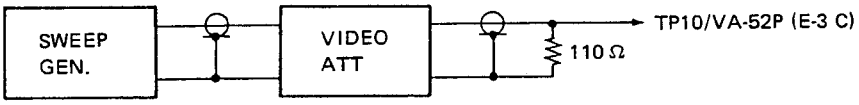
## 11-14-2. C Recording Current Adjustment (Metal)

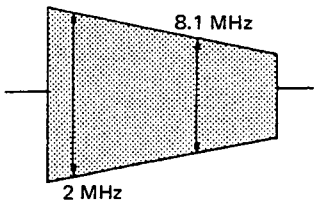
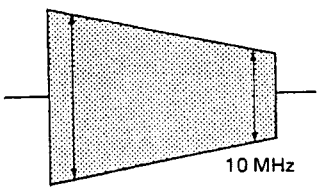



| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Disconnect the CN21/VA-52P (D-4 C) and CN20/VA-52P (E-4 C).<br>• Connect as shown in the figure. Input the 6.1 MHz continuous wave.<br>• Disconnect the CN9/VA-52P (D-1 C)<br>• Connect the extension harness between the CN9 and the harness.<br>• Connect the current probe to pin 3 of the extension harness.<br>• Short with a shorting clip between the TP401/VA-52P (D-1 C) and the GND.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: Y: 100% Flat Field<br>B-Y, R-Y: No signal<br>• REC mode | TP303/VA-52P (G-3 C)<br>Maximize the waveform amplitude.<br><br>CN9-3<br>Measure the recording current value at the current probe. (CA) | Level control knob/<br>Signal generator |
| STEP 2.<br>• Connect the current probe to pin 6 of the extension harness. | TP304/VA-52P (G-2 C)<br>Maximize the waveform amplitude.<br><br>CN9-6<br>Measure the recording current value at the current probe. (CB) | Level control knob/<br>Signal generator |

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 3.<br>• Disconnect the 6.1 MHz signal from TP110/VA-52P (E-3 C)<br>• Remove the shorting clip between the TP401 and the GND.<br>• Connect the connector to the CN21.<br>• Connect the current probe to pin 3 of the extension harness.<br>• Input signal: Y: 100% Flat Field<br>R-Y, B-Y: No signal<br>• Insert a BCT-20M cassette tape.<br>• REC mode | CN9-3<br>  <br>TP102/VA-52P (D-5 C)<br>  <br>A = CA−20 mA<br>(CA is measured value in Step 1.)<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV114/VA-52P (D-3 C) |
| STEP 4.<br>• Connect the current probe to pin 6 of the extension harness.<br>• After this adjustment, disconnect the extension harness, and connect the connector of the harness to the CN9. | CN9-6<br>  <br>TP102/VA-52P (D-5 C)<br> <br>A = CB−20 mA<br>(CB is measured value is Step 2.)<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV116/VA-52P (E-3 C) |

## 11-14-3. Y Recording Current Frequency Response Adjustment (Metal)

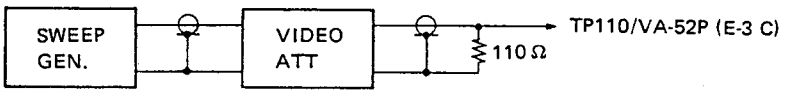


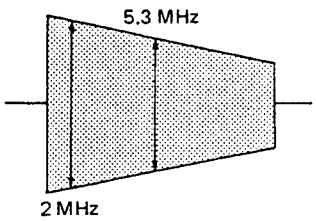

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Disconnect the CN20/VA-52P (E-4 C) and CN21/VA-52P (D-4 C).<br>• Disconnect the CN8/VA-52P (E-1 C)<br>• Connect the extension harness between the CN8 and the harness.<br>• Connect the current probe to pin 3 of the extension harness.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: 50% Flat Field<br>• REC mode<br>• Connect as shown in the figure.<br>• Adjust the 8.1 MHz sweep signal level to Y A in Sec. 11-15-1. by the attenuator. | CN8-3/VA-52P (E-1 C)<br>CN8-6/VA-52P (E-1 C)<br>  <br> | |
| STEP 2. | CN8-3<br>  <br><br>Frequency / Level: 2 MHz — 100% (reference); 10 MHz — 70%<br>TRIG; TP16/SS-31P (E-2 C) | ⊘ RV18/VA-52P (E-2 C) |

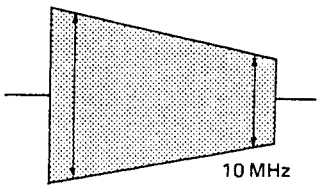
| | | |
|---|---|---|
| STEP 3.<br>• Connect the current probe to pin 6 of the extension harness.<br><br>• After this adjustment, disconnect the extension harness, and connect the connector of the harness to the CN8. Disconnect the sweep generator and the video attenuator from the TP10. Connect the connector to CN20 and CN21. | CN8-6<br><br>Frequency / Level<br>2 MHz / 100% (reference)<br>10 MHz / 70%<br><br>TRIG; TP16/SS-31P (E-2 C) | ⊘ RV20/VA-52P (E-2 C) |

• After adjustment, check the Sec. 11-15-1.

## 11-14-4. C Recording Current Frequency Response Adjustment (Metal)

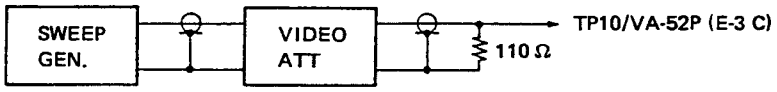



| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1<br>• Disconnect the CN21/VA-52P (D-4 C) and CN20/VA-52P (E-4 C).<br>• Disconnect the CN9/VA-52P (D-1 C)<br>• Connect the extension harness between the CN9 and the harness.<br>• Connect the current probe to pin 3 of the extension harness.<br>6 Insert a BCT-20M cassette tape.<br>• Input signal: Y: 100% Flat Field<br>R-Y, B-Y: No signal<br>• REC mode<br>• Connect as shown in the figure.<br>• Adjust the 6.1 MHz sweep signal level to CA in Sec. 11-15-2. by the attenuator. | CN9-3/VA-52P (D-1 C)<br>CN9-6/VA-52P (D-1 C)<br>  <br> | |

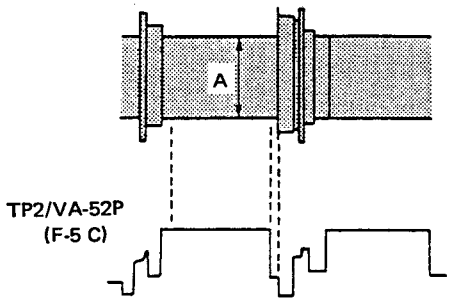
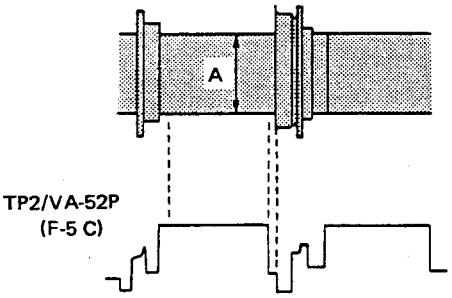
<table>
<tr>
<td>STEP 2.</td>
<td>CN9-3<br>  <br><br><table><tr><th>Frequency</th><th>Level</th></tr><tr><td>2 MHz</td><td>100% (reference)</td></tr><tr><td>10 MHz</td><td>60%</td></tr></table><br>TRIG; TP16/SS-31P (E-2 C)</td>
<td>⊘ RV118/VA-52P (D-2 C)</td>
</tr>
<tr>
<td>STEP 3.<br>• Connect the current probe to pin 6 of the extension harness.<br><br>• After this adjustment, disconnect the extention harness, and connect the connector of the harness to the CN9. Disconnect the sweep generator from the TP110. Connect the connector to CN21 and CN20.</td>
<td>CN9-6<br><table><tr><th>Frequency</th><th>Level</th></tr><tr><td>2 MHz</td><td>100% (reference)</td></tr><tr><td>10 MHz</td><td>60%</td></tr></table><br>TRIG; TP16/SS-31P (E-2 C)</td>
<td>⊘ RV120/VA-52P (D-2 C)</td>
</tr>
</table>

• After adjustment, check the Sec. 11-15-2.

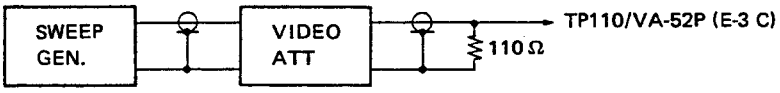
## 11-14-5. Y Recording Current Adjustment (Oxide)



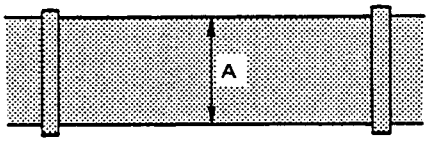

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Disconnect the CN20/VA-52P (E-4 C) and CN21/VA-52P (D-4 C).<br>• Connect as shown in the figure. Input the 5.7MHz continuous wave.<br>• Disconnect the CN8/VA-52P (E-1 C)<br>• Connect the locally special made extension harness between the CN8 and the harness.<br>• Connect the current probe to pin 3 of the extension harness.<br>• Short with a shorting clip between the TP401/VA-52P (D-1 C) and the GND.<br>• Adjust RV17/VA-52P (E-2 C) and RV19/VA-52P (E-2 C) to the mechanical center position.<br>• Insert a BCT-20G cassette tape.<br>• Input signal: 50% Flat Field<br>• REC mode | TP301/VA-52P (G-3 C)<br>Maximize the waveform amplitude.<br>CN8-3<br>Measure the recording current value at the current probe. (YA) | Level volume knob/<br>Signal generator |
| STEP 2.<br>• Connect the current probe to pin 6 of the extension harness. | TP302/VA-52P (G-3 C)<br>Maximize the waveform amplitude.<br>CN8-6<br>Measure the recording current value at the current probe. (YB) | Level volume knob/<br>Signal generator |

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 3.<br>• Disconnect the 5.7 MHz signal from TP10/VA-52P (E-3 C)<br>• Remove the shorting clip between the TP401 and the GND.<br>• Connect the CN20.<br>• Connect the current probe to pin 3 of the extension harness.<br>• Insert a BCT-20G cassette tape.<br>• Input signal: 50% Flat Field<br>• REC mode | CN8-3<br>  <br><br>A = YA + 5 mA<br>(YA is measured value in Step 1.)<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV13/VA-52P (E-3 C) |
| STEP 4.<br>• Connect the current probe to pin 6 of the extension harness. | CN8-6<br>  <br><br>A = YB + 5 mA<br>(YB is measured value in Step 2.)<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV15/VA-52P (E-3 C) |

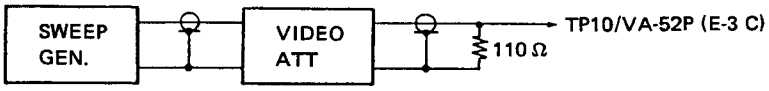
## 11-14-6. C Recording Current Adjustment (Oxide)

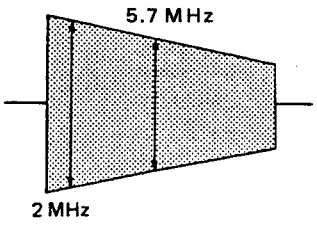
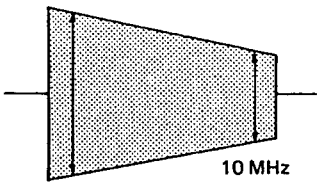



| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Disconnect the CN21/VA-52P (D-4 C)<br>• Connect as shown in the figure. Input the 4.5 MHz continuous wave.<br>• Disconnect the CN9/VA-52P (D-1 C)<br>• Connect the locally special made extension harness between the CN9 and the harness.<br>• Connect the current probe to pin 3 of the extension harness.<br>• Adjust RV117/VA-52P (D-2 C) and RV119/VA-52P (E-2 C) to the mechanical center position.<br>• Short with a shorting clip between the TP401/VA-52P (D-1 C) and the GND.<br>• Insert a BCT-20G cassette tape.<br>• Input signal<br>Y: 100% Flat Field<br>R-Y, B-Y: No signal<br>• REC mode | TP303/VA-52P (G-3 C)<br>Maximize the waveform amplitude.<br>CN9-3<br>Measure the recording current value at the current probe. (CA) | Level volume knob/<br>Signal generator |
| STEP 2.<br>• Connect the current probe to pin 6 of the extension harness. | TP304/VA-52P (G-2 C)<br>Maximize the waveform amplitude.<br>CN9-6<br>Measure the recording current value at the current probe. (CB). | Level volume knob/<br>Signal generator |

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 3.<br>• Disconnect the 4.5 MHz signal from TP110/VA-52P (E-3 C)<br>• Remove the shorting clip between the TP401 and the GND.<br>• Connect the connector to CN21.<br>• Connect the current probe to pin 3 of the extension harness.<br>• Insert a BCT-20G cassette tape.<br>• Input signal:<br>Y: 100% Flat Field<br>R-Y, B-Y: No signal<br>• REC mode | CN9-3<br>  <br>TP102/VA-52P (D-5 C)<br> <br>Adjust to the (CA) which is measured in STEP 1.<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV113/VA-52P (D-3 C) |
| STEP 4.<br>• Connect the current probe to pin 6 of the extension harness.<br>• After the adjustment, disconnect the extension harness. Connect the connector of the harness to the CN9. | CN9-6<br>Adjust to the (CB) which is measured in STEP 2.<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV115/VA-52P (E-3 C) |

## 11-14-7. Y Recording Current Frequency Response Adjustment (Oxide)

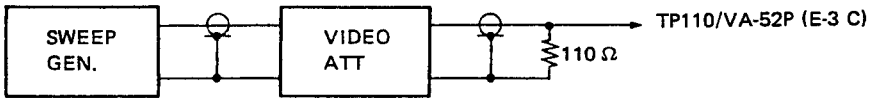


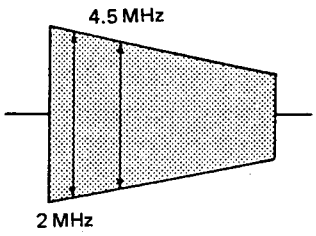

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Disconnect the CN20/VA-52P (E-4 C) and CN21/VA-52P (D-4 C).<br>• Disconnect the CN8/VA-52P (E-1 C)<br>• Connect the extension harness between the CN8 and the harness.<br>• Connect the current probe to pin 3 of the extension harness.<br>• Input signal: 50% Flat Field<br>• Insert a BCT-20G cassette tape.<br>• REC mode<br>• Connect as shown in the figure.<br>• Adjust the 5.7 MHz sweep signal level to Y A in Sec. 11-15-5. by the attenuator. | CN8-3/VA-52P (E-1 C)<br>CN8-6/VA-52P (E-1 C)<br>  <br> | |
| STEP 2. | CN8-3<br>  <br><br>Frequency / Level: 2 MHz — 100% (reference); 10 MHz — 60±10%<br>TRIG; TP16/SS-31P (E-2 C) | ⊘ RV17/VA-52P (E-2 C) |

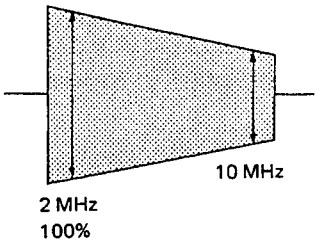
| | | |
|---|---|---|
| STEP 3.<br>• Connect the current probe to pin 6 of the extension harness.<br><br>• After this adjustment, disconnect the extention harness, and the signal at the TP10. Connect the connector of the harness to the CN8, CN21, and CN20. | CN8-6<br><br>Frequency / Level<br>2 MHz / 100% (reference)<br>10 MHz / 60±10%<br><br>TRIG; TP16/SS-31P (E-2 C) | ⊘ RV19/VA-52P (E-2 C) |

• After adjustment, check the Sec. 11-15-5.

## 11-14-8. C Recording Current Frequency Response Adjustment (Oxide)



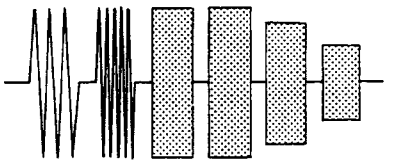

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Disconnect the CN21/VA-52P (D-4 C) and CN20/VA-52P (E-4 C).<br><br>• Disconnect the CN9/VA-52P (D-1 C)<br><br>• Connect the extension harness between the CN9 and the harness.<br><br>• Connect the current probe to pin 3 of the extension harness.<br><br>• Insert a BCT-20G cassette tape.<br><br>• Input signal<br>-Y: 100% Flat Field<br>R-Y, B-Y: No signal<br><br>• REC mode<br><br>• Connect as shown in the figure.<br><br>• Adjust the 4.5 MHz sweep signal level to CA in Sec. 11-15-6. by the attenuator. | CN9-3/VA-52P (D-1 C)<br>CN9-6/VA-52P (D-1 C)<br><br>  <br> | |

| | | |
|---|---|---|
| STEP 2. | CN9-3<br>  <br><br>Frequency / Level<br>2 MHz: 100% (reference)<br>10 MHz: 60±15% | ⊘ RV117/VA-52P (D-2 C) |
| STEP 3.<br>• Connect the current probe to pin 6 of the extension harness.<br>• After this adjustment, disconnect the extension harness, and the signal at the TP110. Connect the connector from the harness to the CN9, CN20, and CN21. | CN9-6<br>Frequency / Level<br>1 MHz: 100% (reference)<br>10 MHz: 60±15%<br>TRIG; TP16/SS-31P (E-2 C) | ⊘ RV119/VA-52P (E-2 C) |

• After adjustment, check the Sec. 11-15-6.

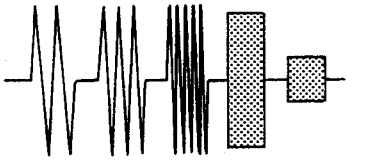
## 11-14-9. Y Overall Frequency Response Adjustment (Oxide)

- The well-aligned BVW-75P (or equivalent) is recommended to get a standard playback machine.

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Input signal: Multi Burst<br>• Insert a BCT-20G cassette tape.<br>• REC mode<br>• Playback the recorded tape using the BVW-75P (or equivalent). | CAV Y OUT/BVW-75P (or equivalent)<br>  <br><br>Frequency / Level:<br>0.5 MHz — 100% (reference)<br>1 MHz — alignment tape PB level ±5%<br>2 MHz — alignment tape PB level ±5%<br>3 MHz — alignment tape PB level $^{+2}_{-8}$ %<br>4.1 MHz — alignment tape PB level $^{+0}_{-20}$ %<br>Measure the levels at the center of moire.<br>• The level difference between the CH-1 and the CH-2 should be in the 5% or the less.<br>• When the specification is not satisfied, re-adjust the Y recording current frequency response adjustment (Oxide) within the specification. After the adjustment, perform the Y recording current adjustment (Oxide). | |

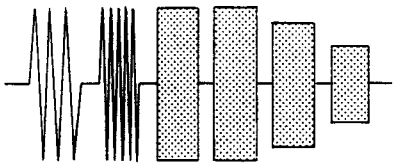
## 11-14-10. C Overall Frequency Response Adjustment (Oxide)

- The well-aligned BVW-75P (or equivalent) is recommended to get a standard playback machine.

<table>
<tr><th>Conditions for adjustment</th><th>Specifications</th><th>Adjustment</th></tr>
<tr>
<td>
• Input signal: Multi Burst<br><br>
• Insert a BCT-20G cassette tape.<br><br>
• REC mode<br><br>
• Playback the recorded tape using the BVW-75P (or equivalent).
</td>
<td>
R-Y OUT/BVW-75P (or equivalent)<br>
B-Y OUT/BVW-75P (or equivalent)<br>
 <br>
0.2 0.5 1 1.5 2 MHz<br>
<table>
<tr><th>Frequency</th><th>Level</th></tr>
<tr><td>0.2 MHz</td><td>100% (reference)</td></tr>
<tr><td>0.5 MHz.</td><td>alignment tape PB level ±5%</td></tr>
<tr><td>1 MHz</td><td>alignment tape PB level ±5%</td></tr>
<tr><td>1.5 MHz</td><td>alignment tape PB level $^{+2}_{-18}$ %</td></tr>
</table>
• The level difference between the CH-1 and the CH-2 should be in the 5% or the less.<br><br>
• When the specification is not satisfied, re-adjust the C recording current frequency response adjustment (Oxide) with the specification. After the adjustment, perform the C recording current adjustment (Oxide).
</td>
<td></td>
</tr>
</table>

## 11-14-11. Y Overall Frequency Response Adjustment (Metal)

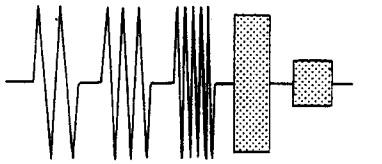
The well-aligned BVW-75P (or equivalent) is recommended to get a standard playback machine.

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| • Input signal: Multi Burst<br>• Insert a BCT-20M cassette tape.<br>• REC mode<br>• Playback the recorded tape using a BVW-75P (or equivalent). | CAV Y OUT/BVW-75P (or equivalent)<br>  <br><br>Measure the levels at the center of moire.<br>The level difference between the CH-1 and the CH-2 should be in the 5% or the less.<br>When the specification is not satisfied, re-adjust the Y recording current frequency responce adjustment (Metal) within the specification. After the adjustment, perform the Y recording current adjustment (Metal). | |

| Frequency | Level |
|---|---|
| 0.5 MHz | 100% (reference) |
| 1 MHz | alignment tape PB level ±5% |
| 2 MHz | alignment tape PB level ±5% |
| 4 MHz | alignment tape PB level ±5% |
| 5 MHz | alignment tape PB level $^{+5}_{-8}$ % |
| 5.5 MHz | alignment tape PB level $^{+5}_{-30}$ % |

## 11-14-12. C Overall Frequency Response Adjustment (Metal)

- The well-aligned BVW-75P (or equivalent) is recommended to get a standard playback machine.

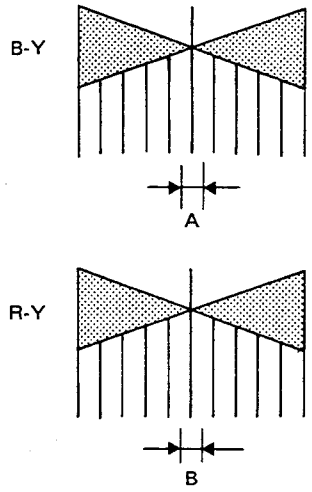
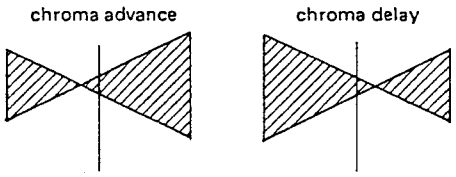
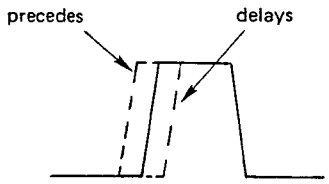
| Conditions for adjustment | Adjustment | Specifications |
|---|---|---|
| • Input signal: Multi Burst<br>• Insert a BCT-20M cassette tape.<br>• REC mode<br>• Playback the recorded tape using a BVW-75P (or equivalent). | R-Y OUT/BVW-75P (or equivalent)<br>B-Y OUT/BVW-75P (or equivalent)<br>  <br><br>• The level difference between the CH-1 and the CH-2 should be in the 5% or the less.<br>• When the specification is not satisfied, re-adjust the C recording current frequency responce adjustment (Metal) within the specification. After this adjustment, perform the Y recording current adjustment (Metal). | |

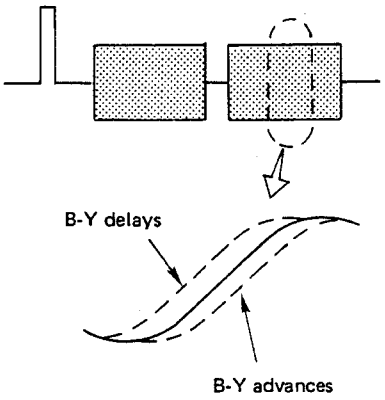
| Frequency | Level |
|---|---|
| 0.2 MHz | 100% (reference) |
| 0.5 MHz | alignment tape PB level ±5% |
| 1 MHz | alignment tape PB level ±5% |
| 1.5 MHz | alignment tape PB level $^{+5}_{-15}$ % |

## 11-15. Y/C DELAY ADJUSTMENT

### 11-15-1. Y/C Delay Adjustment (Metal)

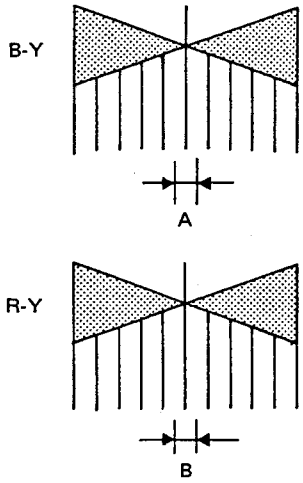
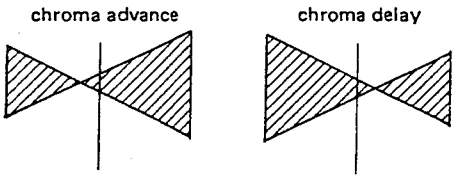
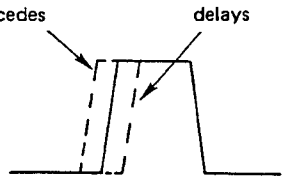
- The well-aligned BVW-75P (or equivalent) is recommended to get a standard playback machine.

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: 50% BOWTIE<br>• REC mode<br>• Playback the recorded tape using the BVW-75P (or equivalent).<br>• Set the Y/C DELAY volume to the PRESET on the BVW-75P (or equivalent). | WAVEFORM monitor<br>  <br><br>Check that the cross point of the waveform is between A and B.<br>A, B = 0±10nS<br>  <br><br>• When the specification is not satisfied, make sure whether the chroma precedes or delays. Perform STEP 2 and 3. | |
| STEP 2.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: 50% BOWTIE<br>• STANDBY mode | TP102/VA-52P (D-5 C)<br>  <br><br>chroma delays; Compensate the REF sync to the right.<br>chroma advances; Compensate the REF sync to the left.<br>Adjust the half of the difference.<br>TRIG; TP208/VA-52P (E-6 C) | ◐ RV219/VA-52P (C-7 C) |

| | | |
|---|---|---|
| STEP 3.<br>• Insert a BCT-20M cassette tape.<br>• Input signal: 50% BOWTIE<br>• STANDBY mode | TP102/VA-52P (D-5 C)<br>  <br><br>TRIG; TP208/VA-52P (E-6 C) | ◐ RV209/VA-52P (G-5 C)<br>B-Y delays;<br>Turn to the right.<br>B-Y advances;<br>Turn to the left. |

## 11-15-2. Y/C Delay Adjustment (Oxide)

- The well-aligned BVW-75P (or equivalent) is recommended to get a standard playback machine.

| Conditions for adjustment | Specifications | Adjustment |
|---|---|---|
| STEP 1.<br>• Insert a BCT-20G cassette tape.<br>• Input signal: 50% BOWTIE<br>• REC mode<br>• Playback the recorded tape using the BVW-75P (or equivalent).<br>• Set the Y/C DELAY volume to the PRESET on the BVW-75P (or equivalent). | WAVEFORM monitor<br>  <br><br>Check that the cross point of the waveform is between A and B.<br>A, B = 0±10nS<br>  <br><br>When the specification is not satisfied, make sure whether the chroma precedes or delays. Perform STEP 2. | |
| STEP 2.<br>• Insert a BCT-20G cassette tape.<br>• Input signal: 50% BOWTIE<br>• STANDBY mode | TP102/VA-52P (D-5 C)<br>  <br><br>chroma delays; Compensate the REF sync to the right.<br>chroma preceed; Compensate the REF sync to the left.<br>Adjust the half of the difference.<br>Repeat the steps 1 and 2 until the specifications are satisfied.<br>TRIG; TP208/VA-52P (E-6 C) | ⊘ RV210/VA-52P (C-7 C) |